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AT HOME IN THE WATER



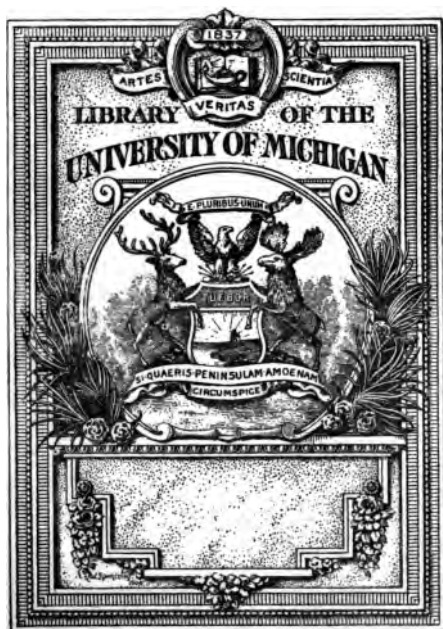
GEORGE H. CORSAN

SWIMMING
DIVING
LIFE-
SAVING



CRAWL STROKE

WATER
SPORTS
NATA-
TORIUMS



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THE PUBLIC BATH—COUNTRY AND CITY

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**BIOLOGICAL STATION
UNIVERSITY OF MICHIGAN,**

AT HOME IN THE WATER

**SWIMMING · DIVING · LIFE
SAVING · WATER SPORTS
NATATORIUMS**

GEORGE H. CORSAN

**INSTRUCTOR OF SWIMMING: UNIVERSITY OF TORONTO, INTERNATIONAL
COMMITTEE OF YOUNG MEN'S CHRISTIAN ASSOCIATIONS**



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FOREWORD

In 1908, according to the United States census statistics, nearly four thousand persons lost their lives through accidental drowning. All but three hundred of these were males. It is a strange fact that many who are daily exposed to danger from drowning do not know how to swim. This is true of lumbermen, of men in the navy, of many who are members of crews on ships and boats. It is not underestimating the facts to say that fully twenty-five per cent of all young men and boys in the United States over twelve years of age do not know how to swim, and the percentage is, of course, much larger when applied to both sexes and to all ages.

Every one should know how to swim, for at least three reasons: It is a splendid form of exercise, judged from the standpoint of physiology, resulting in improved health accompanied by ease and grace of carriage; it imparts self-reliance and courage, which become elements in a man's character, increasing his power both for good and against evil; and finally it may prove the means of saving life.

Foreword

Realizing the necessity for action suggested by these facts, the Young Men's Christian Associations have undertaken to teach swimming upon a very comprehensive basis, their slogan being "Every man and boy in America a swimmer." As one means of stimulating interest, the International Committee employed Mr. George H. Corsan, the author of this book, to give his entire time for a period of several months to instruction upon a wholesale plan, which he has proved himself preëminently qualified to carry out. His unique method has been uniformly successful in giving to the person who does not know how to swim a quick and ready mastery of the necessary strokes. Undoubtedly the custom that formerly prevailed of insisting upon the breast stroke as an elementary mode of propulsion has helped to delay the popularization of swimming.

Mr. Corsan begins with what is known as a crawl stroke, a very simple movement and easily acquired. In fact, it is really an evolution of the old "dog-fashion" paddling practised by the average boy when he endeavors to swim unattended. This stroke is first taught on land to a class of about twenty-five. Then when the boys have mastered its form they are led into the swimming pool. Here Mr. Corsan has introduced two new features. The water in the pool

Foreword

is heated to 80°, so that the pupils will not suffer from discomfort, and as helps to instruction cotton water wings are used under the hips to keep the legs up. These wings permit the pupil to give all of his attention to the arm movements. They are also useful in giving confidence during the early stages of instruction. As soon as the arm movements are perfected, the legs come into play. The wings are soon discarded. In fact, a boy's natural pride is quite sufficient to make him desire to swim unaided.

The use of water wings makes it possible for an instructor to teach many individuals at one time. Mr. Corsan has been very successful in his handling of large classes, well organized in advance. In Grand Rapids, Mich., eight hundred boys were given instruction in one week. In two lessons over two hundred learned to swim fifty feet without assistance.

This volume will prove valuable in public schools, in summer camps and at watering places. It will be found equally helpful to individuals as a self-help method in learning to swim. Mr. Corsan presents other useful information out of his own experience as an expert swimmer. The illustrations are particularly good, and make the book exceptionally interpretative.

GEORGE J. FISHER, M. D.

PART I
SWIMMING



Swimming

INTRODUCTION

There is no pastime or play that is more democratic in its nature than swimming. Where a number of persons are gathered to enjoy this invigorating sport, there is only one line to be drawn—the water level; and the aristocrats are those who can keep their heads above water. In its larger aspect, swimming has an economic as well as a social value, in conserving health. Every State should, therefore, prevent the fountain heads of our rivers from contamination. Every farmer who would have his home attractive should prevent the pigpens and cow byres from polluting the little streams that spring on his soil or pass through it.

Farmers can help their sons to think with pleasure of “the dear old homestead” by having a good-sized “swimmin’ hole” on it. This will help keep the boys from the saloon and make life a little less dry. After a hard day’s work

Introduction to Swimming

a swim will invigorate one and ward off old age. Many an enjoyable hour have I spent running up the grassy bank of a swift-flowing river, plunging in and swimming down with the current, taking in such rapids as were not dangerous, with a delight no tobogganer can ever experience. Then indeed life seems worth living and my thoughts turn to those unfortunates who never have summer holidays.

Every city should have its amateur swimming clubs in which the members may develop the art to its highest point of proficiency, while the spirit of contest, held within reasonable limits, turns putty youths into men of steel.

No person has any right to be in a canoe who cannot swim, and swim well. The soldiers of the French and German army are taught to swim across rivers with their clothes done up in bundles, and carried dry on the head and shoulders; also to swim with all clothes on, holding the gun out of the water with one hand. English and Scottish school children are taught swimming, and the different methods of life-saving, but the Canadian and American school-boards have as yet given little consideration to the needs of children in this respect; and thus the great majority grow up in total ignorance of an art that the people of the stone age considered

Introduction to Swimming

a vital necessity. The word "educated" applies imperfectly to a college graduate who may be compelled to stand on a wharf and see and hear a helpless person struggling and calling for help, unable to spring into the water and rescue him. Let there be a change; the necessity of being able to swim is terribly apparent to the drowning person and the thousands of needlessly drowned have a poor educational system to thank for their fate. But some one has said that there is no such thing as "fate." I could tell some strange stories about persons whom I have offered to teach and who refused my offer and shortly afterward were drowned. Nature is very busy exterminating the stupid.

There is no harder strain on the human constitution than inactivity. To sit still in an office half your lifetime is a far greater strain on the vitality than a trip through Africa, or to the North Pole. To offset the evils of a sedentary life there is no better exercise than swimming, as it brings into activity every muscle in the body without any undue strain on any one set of muscles. The muscles of all good enthusiastic swimmers show an even, proportionate development. Swimming keeps the muscles supple, enlarges the diaphragm and the thorax, wards off consumption, straightens the spinal column, cor-

Introduction to Swimming

rects humpback, and evils that arise from the use of improper clothing. It strengthens the skin, the muscles of which are brought into action, being released from the weight and tension of heavy garments. How often have we seen men walking downtown with their spinal columns in front of their chests! There is no system of motion so powerful for correcting round shoulders as the crawl stroke. This is because the crawl is chiefly deep breathing and shoulder action.

Swimming strengthens the lungs, because it causes deep breathing; it strengthens the nervous system, because it induces natural sleep; it strengthens the spine and enlarges the chest, because it causes the head to be thrown back and the chest out; it strengthens and sets right the pelvic organs, because the body is in motion on the horizontal plane. By the wormlike motion of the trunk characteristic of swimming, all the internal viscera are assisted in their normal functions; hence, bowel, liver, and kidney troubles disappear, and the danger from appendicitis is greatly lessened. Swimming will dispel that tired feeling, because "that tired feeling" is induced by too much rest. Outdoor swimming strengthens the skin and prevents the growth of gray hair.

Introduction to Swimming

Swimming will reduce the corpulent and round off the attenuated. "Swim to health" should be the motto in hospitals, sanitariums, asylums; and every children's playground should be provided with a large shallow pool. Swimming is not only the one sport in which women are at no disadvantage in competing with men, but it is the only form of exercise in which one-legged men, the excessively fat, and the deformed can engage and be on an equal footing with the well.

No man can keep his mind on his business while enjoying a swim, and thus does swimming help to preserve mental balance as well as muscular symmetry. By correcting tendencies to weakness in various ways it improves the temper and disposition; for a healthy liver maketh a cheerful man.

The oft-repeated assertion that water weakens one is absurd, for the vitality of swimmers is as high as that of any other class of athletes. I have met a number of men who would not have their sons taught swimming, fearing that they would become too venturesome. The very opposite is my experience, for of many scores of persons I have helped out of the water, not in a single case did I have to help an educated swimmer, but always some non-swimmer, or a self-

Introduction to Swimming

taught person, who thought that he could do what he saw his companions do, because he was as old as they were or stronger than they.

The Fijians are the best swimmers in the world. They will readily enter the water and kill a shark for a small consideration. On the other hand, the Ojibway Indians, North of the Height of Land, are unable to swim, and when they fall out of a canoe—which is fortunately very seldom—they drown. The temperature of the different waters explains the different degrees of proficiency in the two races mentioned. And it is the same in Sweden, where the small inland lakes and streams are warm in the middle of summer, while the sea water never gets comfortable for swimming in, with the result that the sea-coast people are poor swimmers, while the inland peoples are proficient at the art. Mr. Charles F. Karnopp, of the Grenfell mission, informs me that only one man on the whole coast of Labrador is able to swim. On account of the much more frequent and regular opportunities for practice the swimmer taught in the natorium can generally swim all around the outdoor swimmer in European countries and America. One has twelve months' use of the water to the other's two or three. Winter is the best time to learn the art of swimming; then one

Introduction to Swimming

may practice in the spring, and make his *début* in the summer holidays.

Swimming excels all the other forms of exercise in variety of movement and grace. One can spend a whole lifetime at daily effort in improvement of one's style, and still enjoy the work. But the use of wisely chosen methods is exceedingly important. These methods cannot be explained by words alone. My endeavor in this volume is to demonstrate by illustrations, but the reader will notice that I have only occasionally illustrated the wrong methods by which a stroke or a dive might be performed. It would take a work three times as large as the present one to illustrate and demonstrate all the false motions that are likely to be made by the novice. In any case, it is better to concentrate the attention on correct forms. Rhythmic breathing is one-third of the art of swimming; maintaining the correct angle of the body is another third; and using correct movements is the remaining third.

Types of Swimmer



Pictured at the left is a man of the supple type that will make a good swimmer—long, rangy, free in joint action, deep-chested, and not too heavily muscled. A man of such build will not be cramped in action, nor muscle-bound, but can twist like an eel, is buoyant in the water, and may be readily taught any stroke known to man. His long muscles do not tire.

Here is a powerful man in splendid health, but altogether too heavily muscled for an ideal swimmer. His chest capacity is not disproportionately large, and since his fine rounded shape is the result of even muscular development, and not of fat, he tends to sink. I found him the heaviest live weight I ever towed. Lean meat (muscle) sinks, whereas, fat meat floats.

HYGIENE OF SWIMMING AND BATHING

If you place a live frog in cold water and very gradually bring the water to the boiling point, the frog will be killed without realizing the process or method of destruction. In their lack of judgment regarding the best water temperature, men are not very different from frogs. The common practice of taking a half hour's scald under a hot shower has a decidedly softening and injurious effect on the system. On the other hand, a cold-air bath and a barefoot run offsets the evil effects of a confining sedentary occupation. The shower before the swim should be at the temperature of warm rain—tepid—and neither hot nor cold. The cold shower causes unnecessary work for the heart, as the reaction is simply increased heart activity. The heart is strengthened by rest and not by overwork.

To rest throughout the winter from all violent exercise, and then suddenly dash into the water the first warm day and work the heart for more than it will stand, is a form of abuse that sometimes results in utter collapse. Use judgment and start gradually. Sprinting a hundred

Hygiene of Swimming

yards is violence, while a long, easy swim is a rest for the heart; for the blood is more easily sent along a horizontal body than over a perpendicular course. The skin, as well as the heart, must be treated with some consideration. The millions of nerve terminals on the skin surface, when coming in contact with water at a pleasing temperature, act favorably upon the whole nervous system. Relaxation is the secret of a good swimmer's success in the water. The outdoor swimmer should go into the water only when he is quite warm, and if the sun is not in evidence, then one should warm up by a brisk run or wrestle. Do not try to warm up the swimming pool, lake, or river with your body heat, but have the water pleasantly warm before you go in, say, 72° F. for outdoor, where the strong sun can warm you, while for indoor swimming about 78° F. is right. For a short swim or plunge of course the water may be much colder, but for extended swimming the warmer temperature is best.

Except for racing purposes I always advise all-wool bathing suits. Cotton bathing suits, where the swimmer is in the shade or exposed to a breeze, are very uncomfortable. They remain damp, whereas water quickly runs out of wool and leaves the body dry. Men can-

Hygiene of Swimming

not enjoy swimming while their muscles are shaking and their teeth chattering; neither can they learn much.

Cramps are commonly said to be the result of cold contracting the motor nerves, so that the vital current cannot pass along them to operate the muscles; they are also believed to be caused by the violent use of an unused set of muscles; but they are more often the result of improper diet. They indicate a diseased condition, the result of malnutrition, and belong to that class of diseases beginning with muscular soreness and ending with gout and chronic rheumatism. Cramps generally affect the gastrocnemius muscle of the leg—that is, the calf. Massage and friction will cause the muscle to relax. Should the foot be cramped, place it in hot water or hot sand. I never knew any one to be drowned as a result of cramps, and in all my experience as a swimmer I have never been called upon to help a person out of the water because of cramps. I have helped scores of persons who were in danger of drowning through ignorance, and I have rubbed the cramp out of many a person's leg; but I cannot understand how any one should drown from this cause—much less an expert swimmer, who should easily be able to swim a long way with the arms only. The pain

Hygiene of Swimming

might cause a person to exhale all the air from the lungs, and sink, but I doubt it. The constitutional tendency to cramp can be overcome by dieting largely on raw fruits and taking a low proteid selection among the solid foods. Sun baths and sufficient relaxation will help those who have a tendency to muscle binding. Olive and nut oils in the place of animal fats I recommend to stiff, rusty people. I should use little or no salt.

Do not soap all the natural oil out of the skin before going for a swim; the excessive use of strong soap injures the fine fabric of the skin.

Swim before eating and not after meals, as the distended stomach interferes with the free action of the diaphragm, which is the large breathing muscle. The swimmer, more than any other athlete, needs perfect freedom for breathing. Ordinary practice may be engaged in two hours after eating; but a heavy mixed meal of several courses will require fully five hours to be disposed of so as to enable the partaker to engage safely in violent efforts like those required in contests. A distended colon will greatly interfere with the action of the diaphragm, and I advise all racers to cleanse the colon by an enema of quite warm water. This is known as an "internal bath" or "cascade." Never use

Hygiene of Swimming

medicine for this purpose, as the colon is washed out by the serum of the blood. The method known as purgation is a very expensive and enervating one, eventually ending in piles and general sag.

So far as the swimmer is concerned, the one weak spot in the human anatomy is the inner ear; always get the water out of it after a swim. Artesian water is the worst in this respect, causing often small abscesses and boils to develop, and giving intense pain. Personally I have always avoided the pain by fasting, which overcomes the pressure experienced by the very full-blooded. Cheap rubber appliances may be had that prevent the water from getting into the ear. Deep under-water swimming, or deep diving, will force the water into the ears, and a high dive made sidewise should be avoided. Swimming under water for long distances is very dangerous, often resulting fatally.

The swimmer who undertakes to warm up after a cold swim by drinking whisky or brandy will certainly have trouble.

PRELIMINARY SUGGESTIONS

"All truth is simple," but it takes a great deal of learning to find this out. Modern practitioners of the swimming art have been obliged to establish the proper method, which was perfectly well known to the ancients. In the work on "Swimming," written by Sinclair and Henry, is reproduced an Assyrian bas-relief depicting fugitives escaping from their enemies across the river. These ancient swimmers, men and women, are plainly using the alternate over-arm stroke. I firmly believe that insistence upon teaching the broad stroke on the breast—swimming sailor fashion—as an elementary movement, has done more to hold back the popularization of swimming than all other hindrances combined. The breast stroke should be the last method taught, instead of the first.

The elementary stroke described on later pages is suited not only to boys and girls, but also to gray-haired men and women. I do not exaggerate when I say that I can teach twenty gray-haired old women, for every small child. Small children, with few exceptions, will not pay attention, and they are not strong enough about

Preliminary Suggestions

the shoulders to acquire the correct style. It is a very great exaggeration to say that very small children learn more quickly than others. If you pay for each lesson you will find that the cost of teaching a small child is greater than that of teaching a mature person. Robust boys from ten to fourteen years of age learn quickly. Again, very fat persons are often so tight around the shoulders that they cannot get their arms out of the water, and because of the flesh back of their necks they cannot lift their heads high enough for air. Such pupils I place on their backs, as they can float easily. But the rule is that a comfortable, even layer of fatty tissue all over the body is a great aid to a swimmer, since the fat protects the vital points from cold, and at the same time makes the possessor smooth, thus permitting an easy propulsion through the water. I saw a man of that type do the front push-off to a distance of forty-four feet.

Persons who are muscularly stiff make poor swimmers, and if they have small lung capacity they will always be novices at the art, but these are the very ones who for health's sake need the exercise most. The timid are not by any means the hardest to instruct; the most difficult pupil I ever had was a Welsh miner who had not the slightest fear of the water. When I have an

Preliminary Suggestions

ideal place to teach swimming, I seldom notice much timidity in my pupils, as I start teaching in two and a half to three feet of water, and very gradually reach greater depths. In shallow water an instructor has much more power for effectual and rapid work, as he can reach over and control the limbs of his pupils. On the whole, I find men much more timid in the water than women, and a woman will learn to swim more quickly than a man.

A peculiarity about many women is that their feet float, and should they wade out into shallow water, and get off their feet, they are apt to be drowned, though the water may not be over their heads. Many a time I have rescued a woman who was choking to death, while her companions thought she was fooling. To avoid such an accident the hands should be kept down in the water. If possible, draw the knees up to the chin, keeping the hands moving till the feet strike bottom. But they are not very likely to reach the bottom if they have been sticking out of the water to the rear. A woman's best defense against drowning is to lie still and float on her back till help comes. She should not bend, as that will immerse the mouth in the water. On the other hand, the feet of most men and boys sink, and large-boned, muscular men are so

Preliminary Suggestions

heavy in the water that when first teaching them I have to place two pair of wings under them.

Many swimming instructors object to the use of water wings in assisting the beginner, laboring under the delusion that the pupil learns to rely upon their support too much. On the other hand, I believe in them thoroughly, and keep my pupils working with the wing support for some time, so that they may be absolutely free from any ragged error in style. After the proper style has been acquired, the wings are a positive obstruction, and the pupil is only too glad to get rid of them. For learning to swim on breast or back, the wings are a splendid help. Not nearly so rapid progress is made on the side, but even here they are a help. I place the wings well down below the lower ribs, so as to keep the feet well up, since the upper part of the body is rendered buoyant by the air in the lungs. I start right in with the alternate overarm stroke on the front, or with the beginning of the crawl stroke. The pupil is not asked to place the head down in the water until well advanced on the correct path. The face shifts alternately to right and left; that is, always toward the arm coming out of the water. The mouth and nose are thus tipped slightly sidewise, and always toward the highest side, while the top of the head

Preliminary Suggestions

is held down in the water. This turning of the face alone to right and then to left, instead of rolling the body over, prevents the pupil from rolling off the wings. If the practice is carried on in deep water, be sure that the wings are sound and air tight, as old ones might suddenly collapse and drown the pupil, or, at least, badly startle him. A sudden fright, by the way, I always carefully avoid, for almost all the ragged-style swimmers I meet are those who have been taught by the lazy method of throwing them in and making them swim ashore. And if this fails, they never learn until an expert gets hold of them, for they almost invariably have, afterward, a terrible dread of the water.

The land animal, when thrown into the water, will immediately set up a running motion and make for shore, while man, thrown into the water for the first time, will immediately endeavor to climb out, using the air for a rope. Now, if man would immediately get on the horizontal plane and dog-paddle to safety he would have a very much better chance for his life. I always like to find that my pupil can "dog-paddle" a little, thus I have merely to lengthen the arm work and get the feet higher, and we have the crawl.

The ocean undertow, so fatal to many, is easily

Preliminary Suggestions

avoided by giving a push with the foot on the bottom, thus springing up through the current to the top waters. This is comparatively easy, even for the unskillful. In attempting to get back to safety one should concentrate all efforts on keeping afloat, never straining to grasp the edge of a boat or wharf that may be just out of reach.

It is a good idea to put on a full suit of old clothes and get used to swimming in them; thus, should you ever be thrown out of a boat you will understand how to act. When caught thus, you will find a knowledge of the side-underarm stroke, and the broad-stroke-on-back, as well as the ability to scull, the most practical methods of progression.

The land drill for the arm movements is valuable to those whose shoulders are stiff. Stand with one foot considerably in front of the other, lean over and perform the motions as described in the crawl. There is no practical way of working a land drill for any kind of kick, and the English school method I cannot too severely condemn, as it teaches the throwing out of the knee, or "frogging"; whereas, I consider the knock-kneed position the best. A frog is an under-water swimmer, and possesses two very large web-footed hind hands, that grip the water with far more power than the human foot can.

Preliminary Suggestions

I have found it a splendid idea to be ambidexterous in the art of swimming, as this enables the swimmer to use an entire new set of muscles, and gives that relaxation so necessary in a long distance swim. Relaxation is one of the secrets of graceful swimming, and can only be learned by patience and practice.

I have nothing to say in favor of any swimming device yet invented for increasing the speed and ease of propulsion through the water. I made wings that could be attached to the soles of the feet, and found them of some help, in swimming on the back, but not enough to warrant the bother.

1

2000

Devices for Beginners



1000

[30]

Devices for Beginners



WATER WINGS

This is the only apparatus I use in teaching beginners to swim, whether for individual instruction or for large classes. Without the wings I should be utterly unable to teach a class. In my experience, the Ayvad water wings have proved to be the most satisfactory kind. The sewing is conscientiously done, and the quality of cotton fibre is uniform. The valve arrangement makes quick inflation possible.

TROLLEY AND CORK BELT SYSTEMS

The trolley and cork belt systems of swimming instruction are unnecessarily expensive. Many have learned to swim in this way, and doubtless many more will so learn. But they are crutches, at best, and one does not spend much money on crutches unless he is permanently disabled.

SPRINGBOARD AND BELT SYSTEM

Of the old-fashioned devices the springboard and belt are much easier on the instructor than the pole, rope and belt; but even this way is clumsy, compared with the water wings.



CRAWL
I



CRAWL
II

CRAWL STROKE—LAND DRILL

EXERCISE I

The class is lined up and extended, so as to give two square yards of space to each person.

Positions: Right foot advanced, knees stiff, lean forward to imaginary water level. Back hollowed, chest out. Right shoulder depressed; left shoulder elevated. Face turned toward upper shoulder. Top of head down, mouth up.

Arm motions: The arms are moved regularly and continuously somewhat after the fashion of a windmill, but slower; and always maintaining the same relative distance apart. Left arm swings upward and forward, with palm of hand up and little finger in advance. Left elbow up and fixed. Right elbow up, hands and fingers held straight and flat. Right wrist bends so as to hook and grip the water. Right arm swings downward and backward.

EXERCISE II

Positions: Right shoulder depressed. Right elbow up. Right thumb down. Hands flat. Left shoulder elevated. Left elbow up. Left palm up. Left little finger in advance. Left thumb to rear. Back hollowed, chest out.

Motions: Right arm swings back. Left arm swings forward.



CRAWL
III



CRAWL
IV

Crawl Stroke—Land Drill

EXERCISE III

Positions: Right shoulder elevated. Right elbow elevated. Right palm up. Face turned to the upper shoulder. Left elbow depressed. Left elbow up. Back hollowed, chest out.

Motions: Left arm swings back; right arm swings forward.

The movements are executed entirely from the shoulders, and there is a fixed condition of the elbows and wrists. Always keep the elbows up and out. Do not sway at the waist.

EXERCISE IV

Positions: Right shoulder elevated. Right elbow elevated. Right palm up. Right little finger in advance. Hand flat. Face turned to upper shoulder. Left shoulder depressed. Left elbow up. Back hollowed, chest out.

Motions: Right arm relaxes and swings forward from the force of the rearward movement. Back of right hand just over the supposed water level. Left arm moves back.

Note: The subject in this set of illustrations is of the short chunky build and assumed these positions in spite of his build, thus showing the possibilities of the average person to master the crawl stroke.



CRAWL STROKE—WATER DRILL

I. LEFT SIDE, FACE UP

The swimmer in the illustration is in the act of pushing the water back with the left hand. Note how the water is gripped by the strongly curved wrist. The right hand has struck the water a violent "good-by" blow, and is about to swing forward for the next stroke. A crawl swimmer may send a heavy shower of water behind him when he is sprinting; for, instead of lifting the arm out of the water, he straightens the elbow and swings the arm directly forward. The left foot snaps to meet the right, and then is reversed; this act constitutes a short scissors kick

Crawl Stroke—Water Drill

accompanying each arm sweep through the water, and is more restful and effective than the continuous up and down motion—more suitable for short sprints—used by many crawlers.

2. LEFT SIDE, FACE DOWN

The right arm swings forward and out of the water; the left is still pushing the water back and the swimmer is exhaling the air through the nose under the water; while the left foot has almost struck the right foot in unison with the working of the left arm. Note that the elbows are at all times elevated, this enables the hands to scoop the water back. The coördination between the arm and leg work is like the pacing of a horse, the arm and leg on each side moving together. The use of the trotting motion—right arm with the left leg—would be more exhausting

3. RIGHT SIDE

Both arms are in the same position, relatively to the body, but the left arm is lower, and in the water, rowing the water back. Particularly note the position of the thumb and little finger, the little finger always up, while the thumb is always down. This position must always be held, not only while the hand is dipped into the water, but throughout the whole stroke; otherwise the finish

Crawl Stroke—Water Drill

of the stroke will be clumsy. Try to row a boat using the oars alternately and you will understand this clearly.

The legs come together with a snap and thus all the parts of the body, except the arms, are in a line, like the hull of a finely modeled racing yacht.

4. HEAD-ON, FACE UP

The right hand has just gripped the water in preparation for the stroke. Particularly note the hooked wrist, and the fact that it has struck the water, not flat, but edgewise, like the blade of an oar. The left hand has just left the water with a vigorous jerk as if to throw a bucket behind; this farewell snap as the head leaves the water straightens the elbow and swings the hand clear out of the water, thus saving the effort of lifting it.

5. HEAD-ON, FACE DOWN

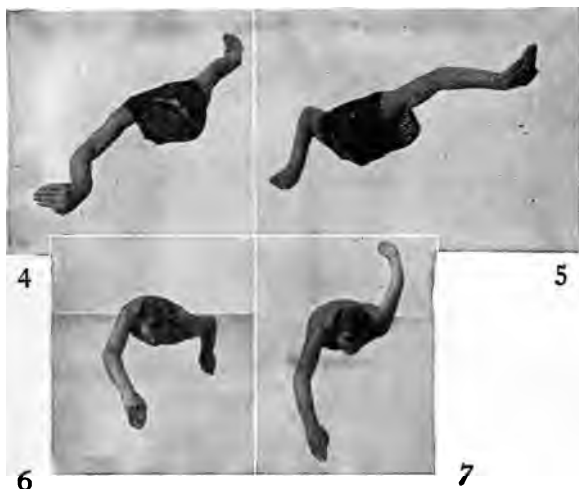
Push the water back with the right hand. Reach forward with the left hand to dip it in the water. Breathe out through the nose under the water. The arms work like a double-bladed paddle in the hands of a canoeist. The wrists and elbows are hooked.

6. HEAD-ON, ARMS DOWN

The left arm is just about to leave the water;

Crawl Stroke—Water Drill

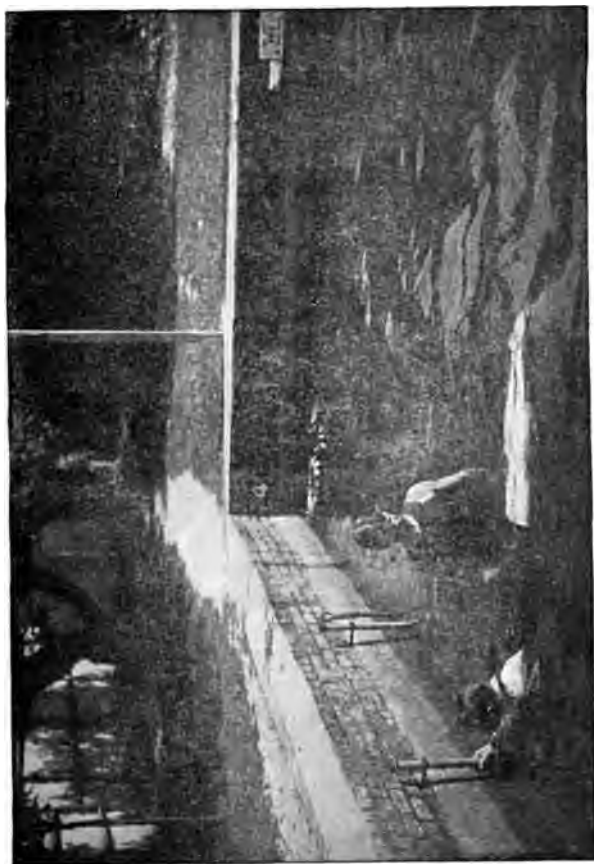
the right arm is starting to pull. The upper figures illustrating 4 and 5, were of a long-armed



man. The elbow of the short-armed man is held straighter; his finger-tips are properly down.

7. HEAD-ON, LEFT ARM UP

The left arm has finished its stroke and is swinging forward over the water. Note that the palm of the hand is up, and that the stroke has been so violent at the finish that the arm will inevitably swing forward with the reaction from the rearward push. The right arm is in the middle of its stroke.



CRAWL STROKE—READY FOR KICK

Crawl Stroke—Water Drill



8. IN ACTION

Note the knife-like, quiet dip-in of the hand, the entire absence of splash. Striking the water a flat downward blow does not send one forward.

The swimmer in the illustration is very heavy in the water, which happens to be fresh; in salt water the same swimmer would show a shallower draught.

9. READY FOR KICK

Demonstrating to a pupil the necessity of lying flat on the water and not spreading the knees by bending at the hips. The reader can readily imagine what a small tunnel in the water the swimmer would go through, in speed swimming, by working the arms only, and not throwing the knees down and outward. The instructor has set the pupil to prepare for the whipping up and down leg motion. The legs are straight but the muscles are relaxed, as in all kicks.

Scissors Kick



SCISSORS KICK

I. LEGS APART

The scissors kick is performed by throwing the under leg far back and striking the water a hard blow with the top of the foot. The upper leg should be held almost straight. The illustration shows the rear man in correct form, while the nearest is decidedly wrong, as his upper leg is advanced and the foot is set instead of pointed. The scissors kick is used in the side underarm, the English overarm, and the trudgeon strokes.

2. LEGS TOGETHER

Finish of the scissors kick. Again the man in the foreground is wrong, as his head is elevated. When the under leg has snapped to the upper leg there should be a distinct pause while the body is gliding through the water as a result of the stroke. The under leg should be thrown back slowly and not with a jerk. The overleg kick is the same as this except that the under foot is recovered out of the water and digs in with a great splash.



I

2a



ENGLISH OVERARM STROKE

I. IN ACTION 2b

ARM ABOVE WATER

This stroke, known as the English racing stroke—favored by Captain Webb—is a side or single overarm stroke. Although it is much harder to teach than the crawl, it is a very restful stroke, and therefore valuable for very long distances. The under leg and the upper arm lead in the act of propulsion. The subject of the illustration is swimming on the left side, and can, after a mile swim on that side, turn over and swim on the right side. The body lies low in the water, as the illustration shows, only one arm being clearly in evidence above water. The under leg stretches as far as possible.

Exhale through nose under water.

English Overarm

2a. READY FOR STROKE—SUBJECT ON LAND

Position: Right arm ready to pull. Left arm ready for forward thrust. Left leg ready to strike water with top of foot. Right leg ready to strike towards left leg. Swimmer breathing out through nose, mouth closed.

The lower leg has the greater power in this stroke. The one-two-three stroke differs from this only in the coördination, as in the one-two-three stroke the upper arm pulls through the water ahead of the strike of the lower leg, thus making a one-two-three continuous strike against the water, three limbs being brought into play, the lower leg and both arms.

2b. READY FOR STROKE—SUBJECT IN WATER

This is also known as the one-two-three stroke when the upper arm pulls a lone stroke through the water instead of moving as the kick is given. The one-two-three stroke derives its name from the fact that the order of action is one, under arm; two, upper arm; three, under leg. The upper leg is held straight all the time. This is quicker, but more exhausting than the old method.

Hold breath at above position. Start kick here for the more restful style of this stroke. The under arm will become numb after a half hour's swim in this fashion; turn on the other side.

English Overarm

3. FACE UP FOR BREATHING

Start kick here as upper arm swings out for the racing style. Open mouth and take in air. As in all strokes, feet high and head low is the rule. A very common fault with swimmers is keeping too high out of the water. More force is required to keep the body an inch unnecessarily high than would carry you a foot through the

ENGLISH OVERARM—3



TRUDGEON

water. This is the result of bearing down on the water, instead of hooking the wrists and pushing backward. The false position in both overarm and trudgeon is illustrated on this page, at the right of true position. The overarm is not

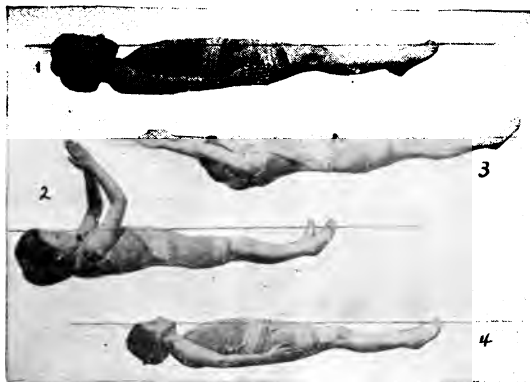
Trudgeon

a good stroke for water polo because it is impossible to look ahead. Look sidewise, but not ahead, and always keep the eyes open under the water to see where you are going.

TRUDGEON STROKE

The arm motion in the trudgeon stroke is the same as in the crawl. The leg, in the crawl, either does not move at all, being merely held straight and dragging behind, or it moves in pacing or trotting time with the arms; whereas, in the trudgeon, there is either a single scissors or overleg kick. This kick works with the pull of the underarm, as the trudgeon swimmer works rather more on one side than on the other. The breath is taken in through the mouth as the kick is delivered. Then, with a slight roll, the underarm is swung over the water, and the swimmer exhales through the nose under water. The trudgeon is an easy stroke for a long distance swim.

There is a cross between the trudgeon and the crawl wherein the big kick is followed by a short auxiliary kick given in pacing time. Pacing is working the right leg with the right arm, and the left leg with the left arm, and is not so exhausting as trotting time.



DOUBLE OVERARM ON BACK

These illustrations, with the directions that follow, show how to coördinate the arms and the breathing. To make the matter simple, I have left out the kick, which is the frog kick. The recovery for the kick is shown in Fig. 2, the delivery of the kick in Fig. 3.

1. Take in breath through mouth.
2. Hold breath—face partly submerged.
3. Start to exhale through nose—face submerged, wrists hooked.
4. From 3 to this position is a long and powerful sweep, the wrists held firm, and the fingers tight together. The body is now gliding through the water, and there is an entire cessation of arm or leg motion while the swimmer takes in air.

Double Overarm

There are three well defined methods of raising the arms from position 1 to position 3: (1) By the bent elbow with the palms of the hands together, as in the illustration. (2) Elbows stiff and backs of the hands together. (3) Loose overlapped arm ahead of swimmer.

This is Monty Holbien's favorite stroke for long distance swimming.

1. ARMS UP

At this point the swimmer is immersed except the forearms and is holding his breath. The frog kick goes with this stroke. It is a strong restful stroke, good for very long distances.



2. HANDS IN WATER BEYOND HEAD.

The hands grip the water beyond the head for a long pull. At this point the whole body is submerged, and the swimmer starts to exhale through the nose under water. Note the hooked wrists. At the finish of the stroke, when the hands strike thighs, breathe in through mouth.

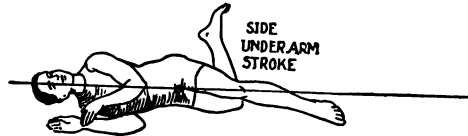


ALTERNATE OVERARM STROKE ON BACK

The left hand sweeps the water back; the left foot strikes the water with the top part in rhythm with the left hand. The arms are the same relative distance apart all the time. A short double kick is given as each hand sweeps the water back

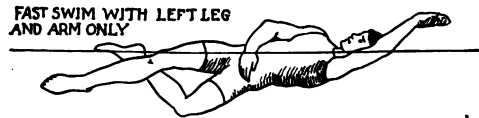


—the short scissors kick for heavy persons; the alternate leg kick for buoyant persons. The double frog kick is the slowest. This is the sprinters' stroke on the back or the crawl upside down. This stroke can be worked with any kick.



SIDE UNDERARM STROKE

The drawing shows the method of the overleg kick. The under leg comes out of the water while the upper leg is held almost straight.



FAST SWIM WITH LEFT LEG AND ARM ONLY

This novel stroke can be accomplished only by lengthy persons. The arm works on the plan of the alternate overarm stroke on back. By twisting the spine, it is possible to throw the left foot back and up out of the water ; after which it is brought down with a powerful blow. The right leg and arm are held still. This is not a tiring stroke and can be kept up for a long time. Rest by reversing and swimming with right arm and leg. Such ambidextrous work is good practice and keeps the motor centers of the brain in good condition.

Floating



MOTIONLESS FLOATING

This is the right position in the water for one whose specific gravity is great. Note the position of the head. The subject is shown at the highest point to which he could float up, even after a deep inhalation of air. On exhaling he would let the air out suddenly, so as to start inhaling immediately; then on full expansion he would hold the air for a while before letting it out, always retaining a certain amount of air. In this manner the lungs can be enlarged and strengthened. Buoyancy increases with age.



MARCHING OR WALKING IN THE WATER

The swimmer goes feet first, by leg action only. It is slow, but novel. Don't kick the water away, but quietly push one foot forward after the other, with toes pointed, and give a down-

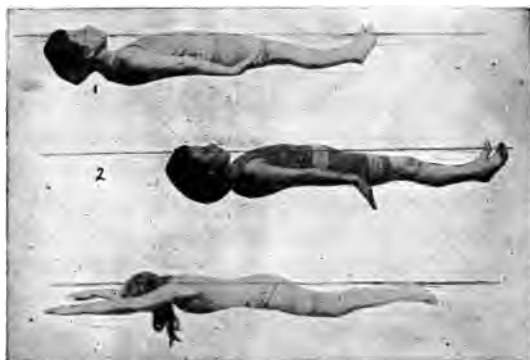
Propeller

ward pull, like walking on a treadmill. You will notice in the illustration, as in several others, that the eyes of the swimmer are closed. The strong sunlight necessary for photographic work is the cause of this apparent error.



PROPELLER AND TORPEDO

When the lungs are inflated to their fullest extent, the subject having assumed the position illustrated, the feet will rise unless specific gravity is very great. The "propeller" is the act of going feet first by a movement of the wrists. The "torpedo" is almost the same; the entire body, however, is submerged, except the toes. A person whose specific gravity is not great can do the "propeller" with ease, for in this feat the air is not shut off, as it is in the "torpedo."



SCULLING

Correct wrist and ankle work is half the secret of good swimming. Sculling is wrist work only, and should be taught to all beginners in the first or second lesson. As shown in the illustrations, the body is flat on the water. This can be accomplished by throwing back the top of the head, and keeping the mouth up. The drawing of a deep breath will enable the feet to rise. Some women, and many men, are so large-boned and possess so little fat that, despite their best efforts, their feet will sink, but by a rapid, sculling wrist movement the heaviest can keep afloat.

I. HEAD FIRST

Going head first, keep the heels of the hands down, and the tips of the fingers up. Work the

Sculling and Feathering

hands with a twist and a push at the same time, as a Venetian gondolier does a paddle. Two persons locking their feet together may use this stroke in a tug-of-war.

2. FEET FIRST

Going feet first, keep the tips of the fingers down, and work the hands by a rapid motion underneath the hips. Point the toes well and you can make fair speed. This is the quietest method of proceeding through the water, and is the method used by the African warrior for a night approach to his enemies who may be on the river in a boat. The silent swimmer can thrust a spear through the unfortunate boatman and quietly retire.

FEATHERING

Assume the position illustrated, holding the feet tight together, and the elbows quite stiff, so as to keep the arms always straight, and the same relative distance apart; then roll around on the back, passing the hands over the hips, and keep on rolling, with the hands circling continuously. The arms move only at the shoulders, the subject breathes in when on his back and out when in the position here shown. The forward moving edges of the hands are elevated so as to feather the water.



BROAD STROKE

I. LEGS DRAWN UP

The last thing a pupil should be taught is the frog kick, since it is the antithesis of the scissors and crawl kicks. In this kick the swimmer strikes the water with the soles of the feet. An even better method is to lie on the back in shallow water, place the hands on bottom, draw the legs up, as in the illustration, then kick out and bring the legs together in one blow.

2. LEGS OUT

The broad stroke on the back is a slow restful stroke. It can best be taught in water a foot deep. Teach the kick first, as in the illustration, on the breast. Then, if a pair of water wings be placed under the small of the pupil's back, the kick can be taught in one minute. If the pupil is at all stupid the instructor may grasp his feet and work them for a few minutes.

In the next movement, or rather the continuation of the first movement—for there is no stop here—the legs bang together to a decided pause and then relax.

Fancy Swimming

REVOLVING STATUE

Straighten out to the floating position on back, clasp hands high over head, take a deep breath, then revolve rapidly by a movement of the head. When done smoothly it resembles a rolling log.

REVOLVING TRUDGEON

Revolve from right to left, or from left to right, as you swim the trudgeon stroke, giving one kick only on each complete turn. This is called "waltzing-in-the-water" when alternated.

SPIRAL OR CORKSCREW

This is revolving with the crawl. There is a short double kick, or rather a continuous fish-tail motion of each leg.

CHURNING

This feat resembles the tumbling of the old-fashioned barrel churn, over and over. Lie on back, with arms at the sides; draw knees up to chin; take a deep breath, and revolve rapidly backward and vice versa. Only the forearms and wrists move. In going forward project the arms outward to the sides.

Fancy Swimming

THE BICYCLE

Lie on either side; support the body by a movement of the underarm; hold upper arm as if grasping the handle of a bicycle. Run around in a circle, as if pedaling a bicycle. By reversing the movement you can just as easily go backward.

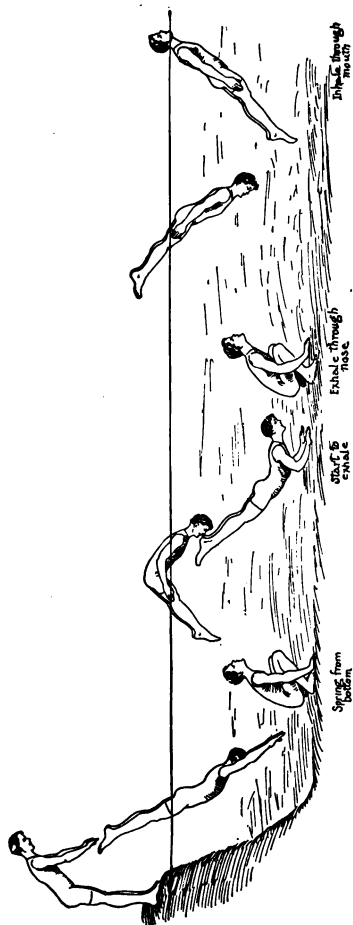
SPINNING TOP

Lie on back, arms to side; draw knees up to chin, and by a movement of the hands spin around either way.

PENDULUM

The better floater you are, the better this can be performed. Lie on back, clasp hands high over head, and then very slowly bring the feet down, and the hands up, until you are in the floating position on the breast; then reverse, and come back again to your original position. Keep the body in a straight line all the time and make no motion excepting the swing of the pendulum.

The pendulum is such a difficult feat that it is very rarely seen in fancy swimming exhibitions. It is a great breath-holding exhibition. Mr. Henry, the greatest English swimmer, who invented "The Porpoise," is an adept at this stunt.



PORPOISE

Imitation of a porpoise in the water is one of the greatest stunts that can be introduced in a swimming exhibition. It is also useful, for like water polo it is splendid practice for qualifying as a life-saver. A vital feature is the method of breathing, indicated in the illustration. The depth of water may be from 4 to 8 feet.

Fancy Swimming

THE LOBSTER

This is swimming backward on the breast, by a rapid, independent, sculling motion of the hands, held out in front, each being used like a paddle to push the water away. Move the feet up and down, near the surface, with a rapid ankle motion the reverse of that employed in the crawl.

THE MUSKRAT

A muskrat, like an otter, swims with his hind feet. Lie on the breast, with legs extended, and heels tight together and close to the surface; bring hands back opposite the hips, and, by a rapid wrist movement, scull forward for a few yards, then sink without throwing the feet up, as in "The Porpoise." Come up quietly, and not with a rush, as in "The Porpoise," and move quietly along the surface; then repeat. When this is done well in exhibition, the nature-wise spectators are pretty sure to exclaim "a muskrat," not needing to be told the name of the feat. There is no foot action whatever.

SWIMMING WITH HANDS AND FEET TIED

A tournament or public entertainment may very well be brought to a climax by an exhibition of swimming with hands and feet tied, a feat by no means easy, and yet not so difficult as it sounds. The swimmer lies on his back, and throwing both hands out of the water, first to the left, and then to the right, brings them down, and sweeps the water back while both legs work on the opposite side, striking the water with the top of the feet.



PART II
DIVING

Diving

INTRODUCTION

Foolhardiness and dare-deviltry never made good divers. Always use discretion and caution. Before taking a dive in strange water, enter it quietly, and examine the bottom well for snags, rocks, or barb wire. Open your eyes under water to see where you are going. Opening the eyes under water will make them strong, and not weak. I frequently have a pupil who trembles with fear on entering the water, and is in no condition to absorb any instruction. Such timid ones should take the floating position, face downward, and open their eyes under the water until they become somewhat familiar with its nature. A pair of water wings may be used, under the waist, if the water is deep. For the first dive it is well to stand about two feet above water level. Fix the eyes upon a spot five or six feet away. Imagine that a fence or hurdle is immediately in front of you and must be cleared. Stand

Introduction to Diving

erect, then spring off, throwing your head down. Aim at the skies with your feet. Don't stiffen the spine. To come up quickly, throw back the head when in the water.

For experimenting on a new dive, wear a girdle or protector around the trunk. In flat dives, when "the head is out before the feet are in," the region just in front of the bladder receives a very painful blow. The lower part of the abdomen gets the full force of the impact. In high or low diving, on approaching the water, always contract the abdominal muscles to as hard a tension as possible, protecting the viscera from injury.

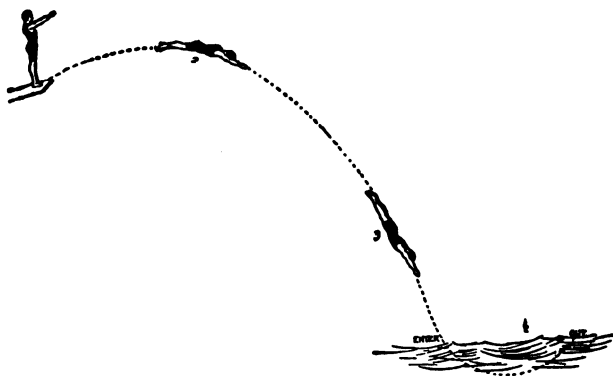
A good type of diving tower can be built over the open deep water. It should have graded heights at three feet, then at twelve, at twenty, at thirty, and at forty feet. Forty feet is as high as any amateur swimming club should build a diving tower. A slide could be built on one side of the tower and a trapeze on the other. Then with runways and springboards from each height, the members of the club can become acquainted with the spring-board method, instead of the method of diving from a solid platform, which is not nearly so enjoyable. A ten-meter dive from a solid platform is the official English Olympic high dive.

Introduction to Diving

In choosing a springboard always use Georgia pine. Hickory is too dear, and no more resilient than good Georgia or Florida pine. Oak will warp, but the worst wood to dive from is hemlock, which has no spring at all. White pine is treacherous, sometimes breaking off short. I find that carpet affords a better foothold for covering a springboard than rubber matting.

In a diving competition there should be two judges and a referee. The referee should stand at the rear, while one judge views the competition from the right side and one from the left. The degree of difficulty should always be taken into consideration when points are being added up. Thus, if the perfect dive receives 10 points, the degree of difficulty may be 0, 1, $1\frac{1}{2}$, or 2 points, which are added to the 10, 6, or 4 points that the competitor may get for his dive.

In a swimming, diving, and plunging competition between clubs, the visiting club will find it worth while to choose very carefully the judges of the diving and the measurers of the plunging. The home team has a certain advantage in its knowledge of currents, nature of bottom, etc., and due allowance should be made for all degrees of difficulty. When a dive is a failure the degree of difficulty is not given. A repeated dive should receive no points.



NEAT DIVE

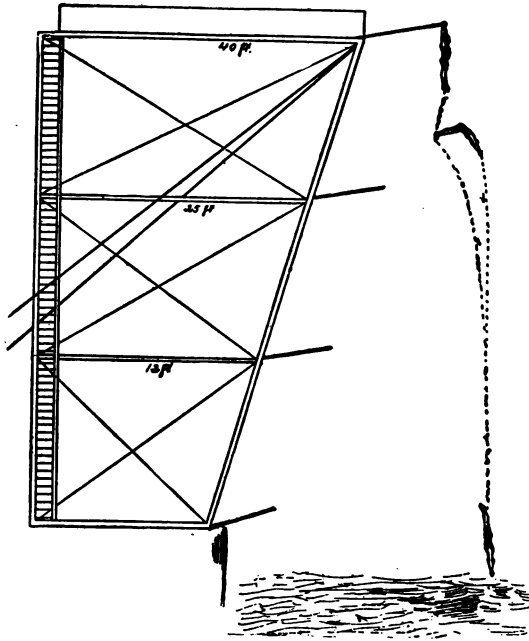
To get into the water gracefully, head first, and come out to the top without a motion of the limbs, is the object of a neat dive. A clumsy diver will go deep, while a good diver will make a shallow dive of it, but, if you want to enter the water like a knife and without a splash, you must go deep. On the other hand, the turn made just before entering the water in order to make a shallow dive will of necessity cause a splash. I always advise competitors to find out what the judges want.

Neat Dive

Stand erect, toes over the edge of the board or platform, hands down at the sides, lean over to an angle of 45 degrees and lose balance; throw the feet up, and the head down, forming an arc in the air, the hands meeting straight above the head, and the head well tucked in between the arms. This breaks a way in the water and protects the head from a blow. The hands act as a rudder and steer a course. With the heels of the hands down, and the tips of the fingers turned up, a shallow dive may be made. Remember that the tips of the fingers determine the body's course under the water. If they are straight the body will keep the angle at which it entered the water. If they are turned down the course will be downward; if up, the body will follow toward the surface.

Never enter the water with the palms of the hands together; keep the thumbs locked, with the backs of the hands up, and the palms facing downward, the forefingers together.

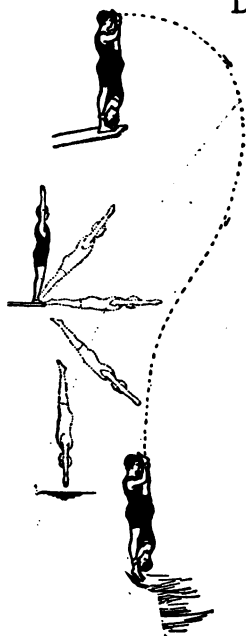
In entering the water always remember that the head is the heaviest part of the human anatomy, and that if you turn it down the body will, of necessity, follow. Turning the head down is the best way to avoid landing flat on the stomach. To come up very quickly, throw the head back immediately after entering water.



DROP DIVE

The higher from the water this dive is taken, the easier it is to get the head down, and make a dive of it. In a contest, it is forbidden to give such a tug on the board before leaving as will enable you to throw back your heels. The illustration shows an ideal diving tower with runways and springboards.

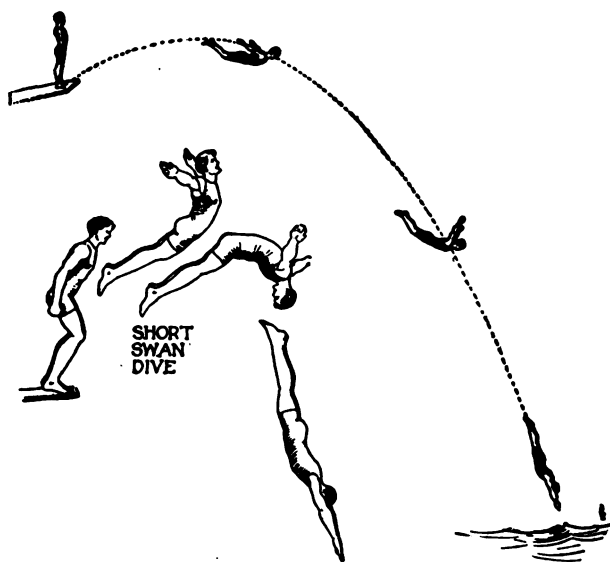
WOODEN SOLDIER OR DEAD MAN DIVE



About twelve feet from the water is a good height from which to perform this dive. Keep perfectly stiff, and upon touching the water limber up, arch the back, and turn so as to make as shallow a dive as possible. This dive can be made with equal safety backward or sidewise, and is then called the back or side wooden soldier.

TWO WOODEN SOLDIERS DIVE

Twelve feet is the best height from which to perform this dive. Keep stiff and tight together. Let the best man stand on his feet, as he has to do the tumble-over act. After entering the water, let each man try to get up before his comrade. The water should be deep, for the divers are carried very far down.



SWAN OR SWALLOW DIVE

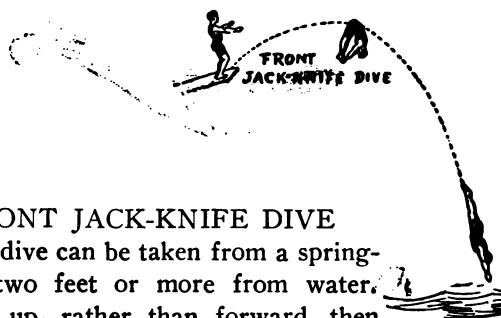
Take a good run, landing on end of spring-board, feet together, back hollowed, head well back; jump high up for short dive, well out if distance to water is considerable.

Positions: (1) Arms at thighs; (2) arms at right angles to body; (3) palms twisted up, arms bent back of head, which is turned down; (4) arms pointed toward water, body following.

Swan Dive



This is a most graceful dive to witness especially if taken from a good height. Even a short dive may, however, have the essential wing-like motion of the arms. Keep the whole body relaxed except the arm muscles, which are tense while arms move from one position to another.



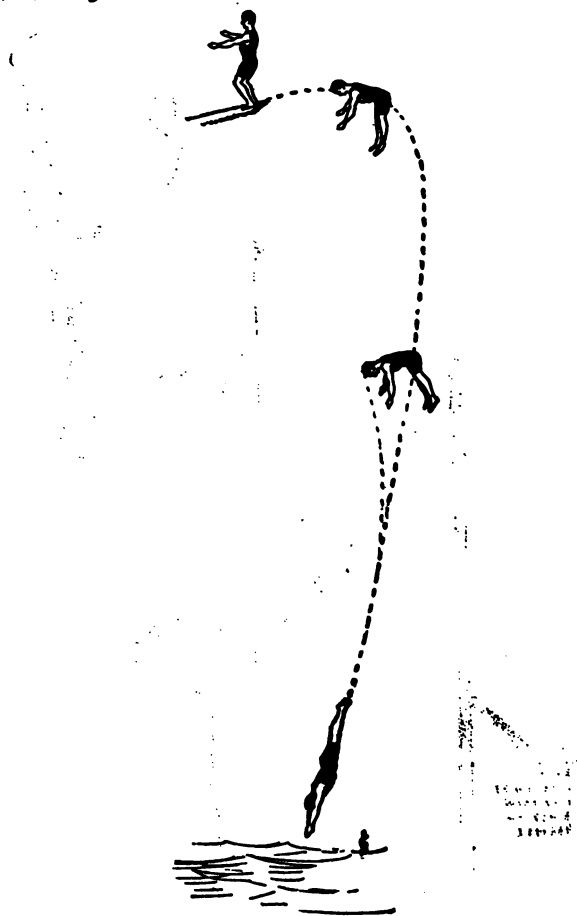
FRONT JACK-KNIFE DIVE

This dive can be taken from a spring-board two feet or more from water. Spring up, rather than forward, then bend the body like a jack-knife, with the knees stiff, and touch the toes. Be careful in straightening out that you get your proper angle; otherwise, you will go over too far and strike on your back. This is a splendid dive for correcting the bad habit of throwing the heels back in the air.

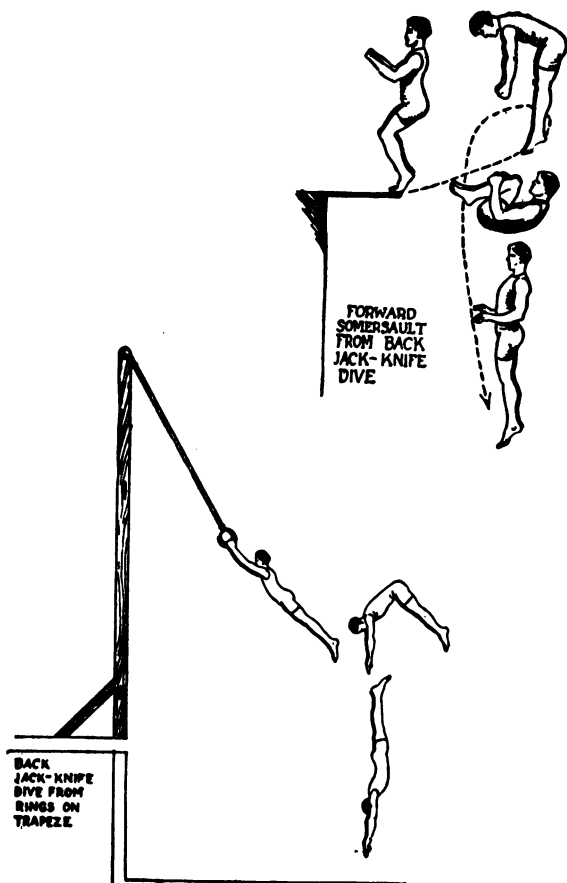
BACK JACK-KNIFE DIVE

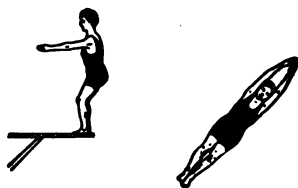
This dive can be taken from a two-foot spring-board, and is one of the safest dives to take from a great height. If the board is near the water, spring up, rather than back, and dip the head down very quickly. If the height is greater, spring well back, and head for the water not too quickly. If the leap be taken from a great height, beware of the strong, sudden gust of wind blowing you on your side, and thus breaking the ear drum.

Back Jack-knife Dive



Jack-knife Dives



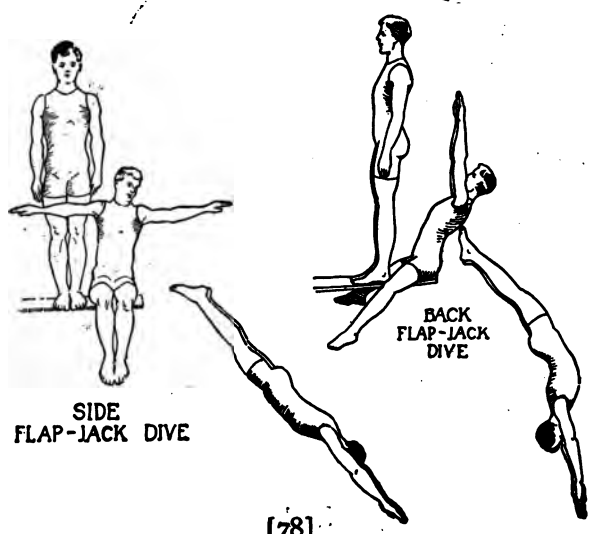
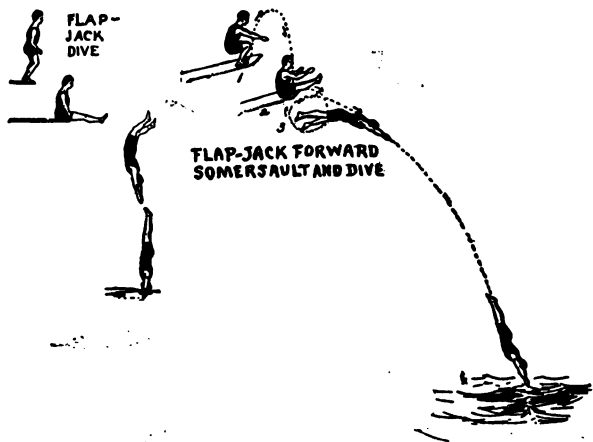


BACK-FORWARD DIVE

Spring off backward, twist around in the air like a cat, and enter and leave the water as if you were taking a straight neat dive. It counts against you if you make the slightest turn before leaving the board. If the height is great, be sure to spring far out and turn slowly; otherwise, you will land flat on the side or back. Be sure to aim far out, or you will go over too far.



The corkscrew dive is the reverse of this; the diver stands on the board facing the water, and twists around, so as to enter the water on the back. Or he may make a full turn and enter on the breast. The corkscrew is a skimmer dive.



FLAP-JACK DIVE

Two boards are shown in the illustration, but this is not necessary. As soon as you land on the board sitting, duck head and spread legs well apart. If you neglect the precaution of spreading your legs apart, you will receive a hard blow from the under part of the board, on the calf muscles of the legs.

Anywhere from two to twenty feet is a practical height for this dive. If a low springboard is used, duck the head down quickly. Tie a big soft towel to the end of the board before doing the flap jack. Harden up under thigh muscles just before landing.

The flap-jack dive can be done backward, and is then called the back flap-jack dive. Curve the back well after landing on the board. The rebound is sufficient to throw you out far enough.

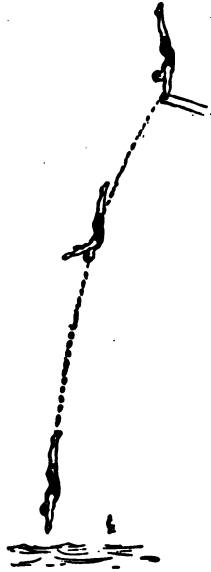
The stand-sitting-standing dive is just what its name indicates, and is more an exhibition of gymnastic skill than of fancy diving.

FLAP-JACK SOMERSAULT AND DIVE

Only one springboard is necessary for this dive, and twelve to twenty-one feet is the proper height. Keep the eyes open until immediately before entering the water. As long as the body is doubled up it will keep revolving; as soon as it is straightened out the revolutions will stop. It is important to stop at the right place.

HAND STAND DIVE

Learn first to balance yourself well on your hands. For the best effect, in exhibitions, the plunge should be taken from a height of thirty feet. Keep the arms well out at right angles to the shoulders. Steer with the hands, and not with the feet.



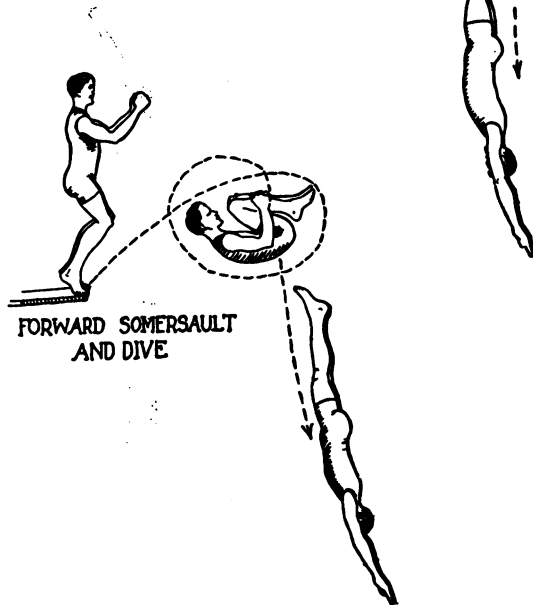
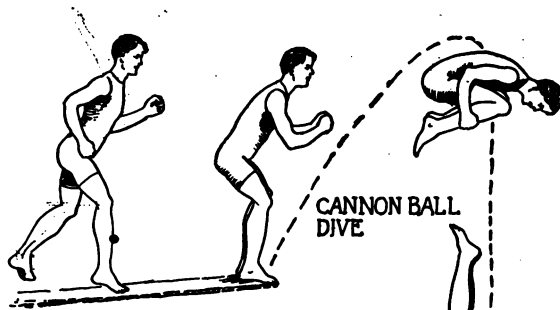
BUTTERFLY DIVE

Leave the springboard with arms extended, as in the illustration. Choose a good height for this dive—from thirty to fifty feet. Spring out straight; keep the eyes open, and close them just before entering water. At first, do not try to make a shallow dive of it.



"The 'flying squirrel' dive is similar to this, except that the diver alters his position in the air by raising and lowering the head.





CANNON BALL DIVE

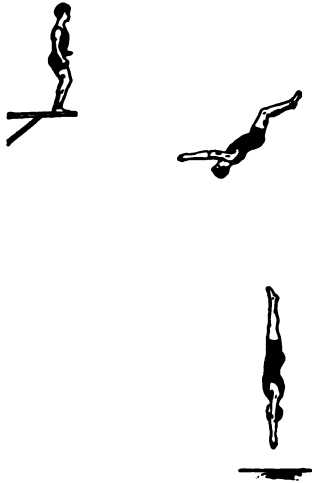
Double up without turning over. This dive looks well from a height but can also be done from a low springboard.

FORWARD SOMERSAULT AND DIVE

This can be performed from any height over two and a half feet. But it takes a very good tumbler to turn quickly enough for the low dive.

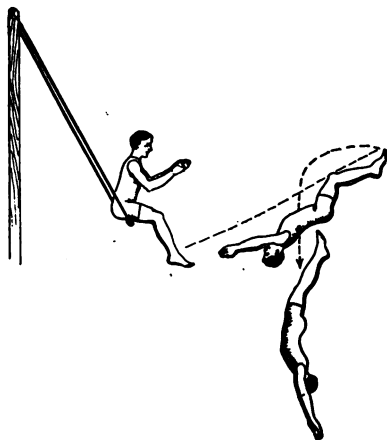
THE COMEBACK DIVE

This is the king of all dives, no feat being impossible to one who can perform the comeback dive well. A springboard two feet from the water, if it has sufficient spring in it, may be used. Throw the feet well up and the head far back, making a distinct crescent of the back if the leap is taken from a low board; from a high board straighten out sooner. From the springboard the feet go forward and up while the head is thrown back.



COMEBACK DIVE FROM TRAPEZE

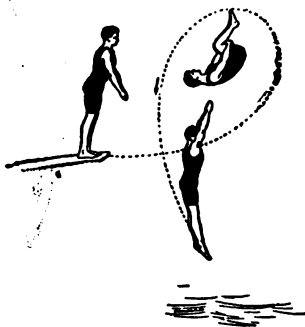
Swing up as high as possible and do not turn too violently; in fact, let the swing do most of the work or you will turn too far. Standing dives can be performed almost like the sitting dives except that the body is more erect. Always let go the rope on the out swing and do not spring from the bar.

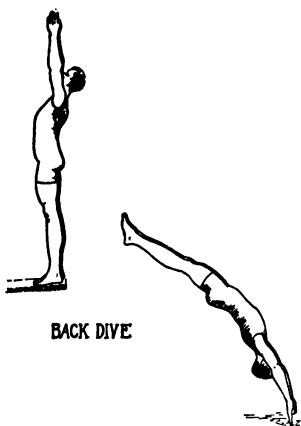


GAINER

If a clumsy tumbler does a back somersault he lands on his feet a yard or more back of where he stood; but, if he is a good tumbler, he will make a spotter, that is, land where he stood, the feet striking the very spot they left. Now, should he be an extra good tumbler, he might make a gainer, that is, advance in alighting. But, in leaping from a springboard over water lower than the board, this is a comparatively easy task.

A gainer is half a circle more than a comeback, and is not a dive, as the body enters the water feet first. Double up more than for the comeback, and, strange to say, the gainer is easier than the comeback. Try for the gainer from a good springy board.





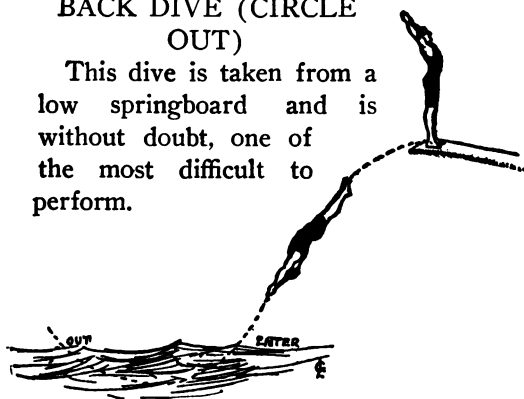
BACK DIVE

This dive can almost be taken into a tub of water. Arch the body well and merely fall back—spring off if you are very near water level. The dive can be performed from water level up to twelve feet. Above twelve feet

the risk is too great.

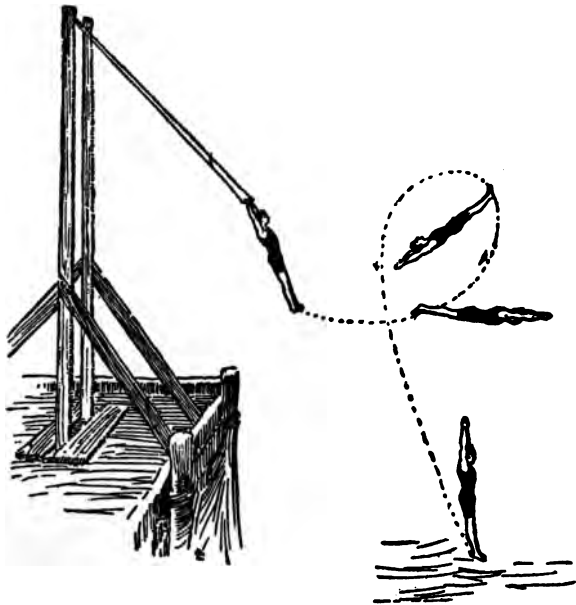
BACK DIVE (CIRCLE OUT)

This dive is taken from a low springboard and is without doubt, one of the most difficult to perform.



LAY-OUT FROM TRAPEZE

This dive may also be made from a horizontal bar. As may be seen from the illustration, a half circle less would convert it into a splendid dive, and yet it is more difficult to make the dive than the feet-first entry. I have, therefore, shown the easy way. If the dive is performed let it be from a good height.



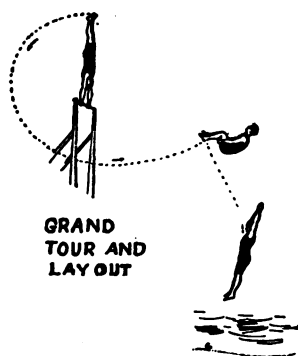
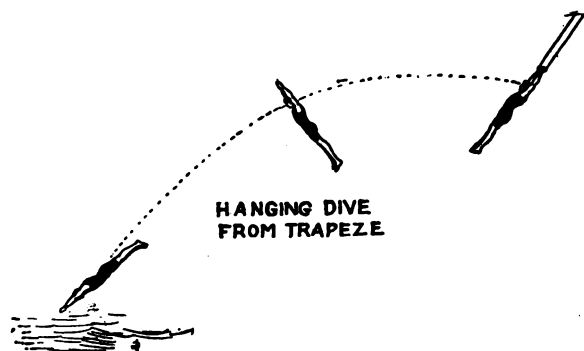


HOCK SWING OFF TRAPEZE

As the illustration indicates, this is not a dive, but a half circle more. It enables one to perform a beautiful dive after the fashion of the comeback, and is a good preparation for the comeback. In fact, this could be converted into a gainer.

To perform a simple dive, let go of the trapeze bar quickly, without jerking. To land feet first, give a jerk with the knees immediately before leaving, just a slight tug. But, for a comeback or gainer, give a good, strong, quick tug.

This hock-swing-off can be performed from a horizontal bar. Keep the legs tight together and land in the water with the toes pointed, and the arms well above the head, but as soon as you land in the water, spread both arms and legs. If you wish to sound bottom, keep straight and well pointed.



HANGING DIVE FROM TRAPEZE

Swing as far out as possible, but be sure to let go before you get to the end of the possible swing. A little tug on the bar enables you to get head down and feet up, which is no easy matter.

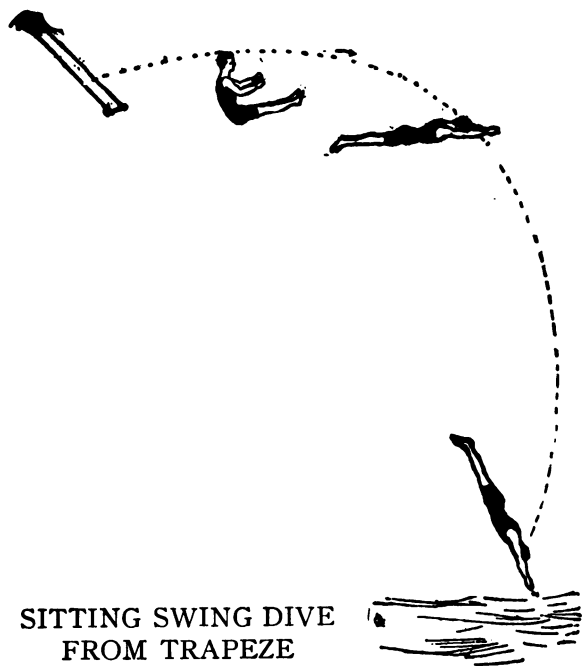
A comeback dive can be easily performed from this position. Also a plain dive, from the other end of the swing.

GRAND TOUR AND LAY-OUT OR FLY- AWAY

FROM HORIZONTAL BAR

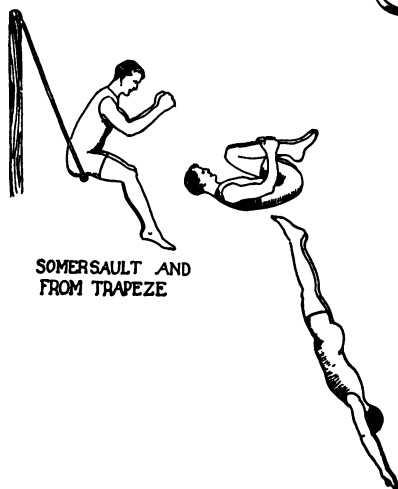
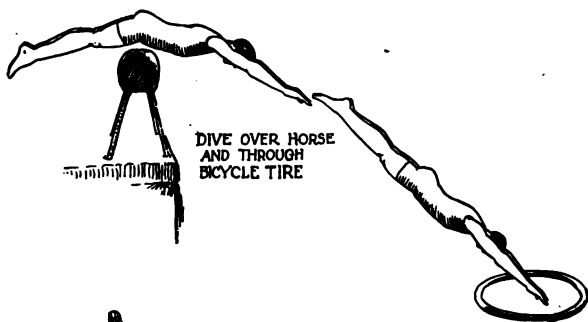
Clasp the knees for a fifth of a second, and then straighten out.

Over water is the best place to learn these giant swings, back and forward. Many things may be attempted over water that one would be too timid to do in the gymnasium, because water is a softer bed to land in than mats. Every well-equipped natatorium should have some gymnastic apparatus over the water.



SITTING SWING DIVE FROM TRAPEZE

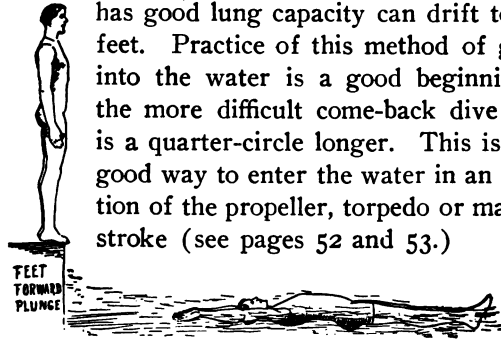
This is certainly one of the most pleasurable dives yet invented. As the saying is, "You never wet your back." Get up a good high swing, about twenty feet from the water, and let go on the out swing—never on the stop or return. From such a height, I have made such a shallow dive that I did not enter the water, but skimmed along the top of it. A standing up dive can be performed with the same ease.



FEET FORWARD PLUNGE

This is taken from a low springboard. Spring well out, feet first, toes pointed, legs together.

Throw arms high over head just before striking water. Thirty feet is a good plunge, but a man who floats well and has good lung capacity can drift to sixty feet. Practice of this method of getting into the water is a good beginning for the more difficult come-back dive which is a quarter-circle longer. This is also a good way to enter the water in an exhibition of the propeller, torpedo or marching stroke (see pages 52 and 53.)



RACER'S PLUNGE

This dive should be taken from a point near water-level. Having made himself as narrow and as straight as possible, the diver's object is to skim along the surface of the water without wetting the back. Take a deep full breath, lean toward the water, swinging arms up over the head. Stretch well out and spring off, pushing

Long Plunge



from the end of the springboard or from the upright edge of the wharf, instead of the top. Do not lift the head from between the arms.

LONG PLUNGE



In this modification of the Racer's Plunge, the performer goes deeper into the water, describing a downward curve, the lowest point of which is about five feet under the surface. Begin as in the Racer's Plunge except that the hands are pointed more sharply, one lying over the other. Guide the curve with the wrists. Eighteen inches is the

height above water for the take-off, and one minute's time allowed for the drift. Unless the competitor's heels show above the water during the drift he need not hope to exceed in his feat, as the body stops going forward when the feet sink. This is generally the fat man's specialty.

The distance between the two figures is much shortened in the cut.

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PART III
LIFE SAVING

Life Saving

It is a peculiar fact that non-swimmers, upon being precipitated into the water, will do everything that is possible to drown themselves.

They shout all the air out of their lungs, whereas a deep groan would be just as effective in drawing attention to their plight; they struggle far too hard, and thus shake all the air out of their clothing, again making themselves less buoyant; they not only throw the hands and arms out of the water, but they try to lift their heads up, thus sinking the body much deeper. If a swimmer attempts to rescue a non-swimmer, the ignorant person will attempt to drown the rescuer by desperately clutching him and impeding his movements, and by trying to climb on top of him. Never try to reason with a person struggling in the water, as even the most intelligent non-swimmers act like insane persons.



FATAL ERRORS OF NON-SWIMMERS

1. THROWING BOTH HANDS UP

A common and often fatal error made by persons who cannot swim, is the throwing of both hands out of the water. This action will sink the body very quickly. Always keep the hands down in the water and endeavor to dog-paddle to safety. All land animals from mice to cattle will instantly get on the horizontal plane and dog-paddle to safety, but man keeps on the perpendicular and tries to fly to safety.

Axiom: One hand out of the water weighs more than the whole body in the water.

2. KEEPING THE ARMS IN THE AIR

Even a good swimmer cannot keep the arms high out of the water for long, but must gradually sink until he cannot even scream, which,

Fatal Errors

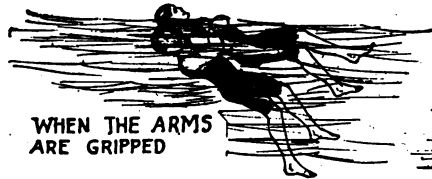
by the way, is another grave mistake, since one cannot have too much air in the lungs. Throwing the arms out of the water is not the last thing drowning persons should do, but one thing they should never do.

3. WADING WITH ARMS UP

In such a simple matter as wading in the water, there is a right and wrong way. Many persons have saved their lives by pushing themselves back with their hands when about to enter a hole. On the other hand, many thousands are drowned by suddenly stepping over the edge of a hole. The one foot on the bottom has not hold enough to bring the person back out of danger when the sand on the edge gives way, and the bather is precipitated forward over his depth.



Life Saving



If you are caught in the water with clothes on, never try to swim fast. When weeds are thick, "porpoise" out of them (page 62), or crawl over the top of them. Never give the frog kick among weeds; keep the legs straight as much as possible.

LIFE-SAVING METHODS

1. TO KEEP FROM BEING SEIZED

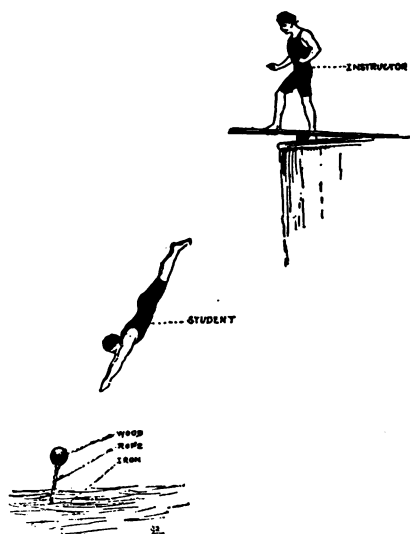
The extensor muscles of a weak person's legs are much stronger than the flexor muscles of an athlete's forearms. Thus it is that any one can easily double up and push away another who would seize him from the front.

2. WHEN THE ARMS ARE GRIPPED

In this case, the swimmer had his legs free and back-swam to safety. He pushed the head of the non-swimmer down. If the legs are gripped by the rescued, then scull to safety by the wrist movement.

3. REMOVING THE COAT BEFORE DIVING

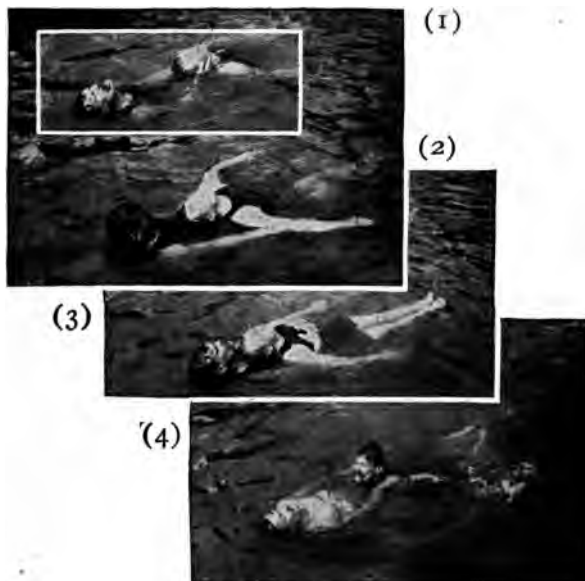
In an undressing competition in the water, the coat is the hardest garment to dispense with; and, in fact, the best way to get it off is to throw the arms back and swim downward. The ordinary method tends to make the wet sleeves stick like glue to the arms, and then to the sides. Should you be precipitated into the water with your coat on, if you are unable to get it off quickly, button it up. Swimming with the clothing on is not at all hard unless the swimmer makes it so. Trying to go fast soon exhausts one and often leads to the frantic struggle that is fatal. Don't throw up the arms; keep every part but mouth and nose under water; turn on the back.



Life Saving Methods

4. HOW TO GET A SUBMERGED BODY

The weighted wooden ball has been thrown into the water, and the pupil sent after it. At first, he sees where it falls, but later, he should have his back turned to the water when it is thrown in, and thus be made to search for it. Diving for a mud turtle is great fun and good practice; try it. The assertion that opening the eyes under water causes blindness is absurd. On the contrary it strengthens them. The best way to search for a human body in semi-opaque water, is to swim on the back, close to the bottom, looking upward against the light. It is possible thus to see not only more clearly, but also over a much greater surface. When the human body disappears under the surface, it generally moves through the water for a time, halfway between the bottom and the top. Lean, bony people will be found not far from the bottom, those having much flesh nearer the surface.



5. TOWING A NON-SWIMMER TO SAFETY

Position (1): This is the easiest method, but can be used only with a person who is incapable of resistance. Keep the top of the head well down and the mouth and nose up. Swim on the back with a leg kick. Keep the body of the subject as nearly horizontal as possible, thus rendering it easier to tow; a push from below with the knee will do this. Such a subject can also be towed by the side underarm stroke, being

Life Saving Methods

held under the armpit with the rescuer's upper hand.

Position (2): Should the subject in position (1) show signs of making a struggle, slip to this position. If he kicks while in this position don't let that worry you, for kicking helps; but, should he try to twist and turn on you, then change to position (3). When one is tired of swimming in this position, if the subject is amenable to reason, it is well to turn on the side and swim by the side stroke, placing the upper arm under the subject's armpit, still keeping him on back.

Position (3): This is the hardest but also the safest method of towing. In this case it is impossible for the subject to turn on his rescuer, who is always behind him—the only safe place. The clutch of a frightened person in the water should never be trifled with; he will sometimes sink not only the nails, but the fingers, into the flesh.

Position (4): Pushing an exhausted swimmer through the water. The person helped lies on his back, and simply keeps his elbows stiff, while his rescuer swims as easily as if he were alone. The rescued man does not bear down with his hand on the swimmer's shoulder, but simply keeps his hand open. This method can be brought into use only when the rescued is an educated swimmer.



RESUSCITATION

I

Set to work on the subject immediately. Press the doubled-up arm close to the side, as in the illustration. See that the mouth is open and the teeth not clinched. It may be necessary to pry open the mouth with a wedge. Loosen the collar. Order some one to have hot applications for external and internal use ready while you are working over the subject. Occasionally listen for the beat of the heart.

2

Turn the mouth down, and keep it down, thus permitting the slime to drain out. Grasp the subject's left elbow with your right hand. Keep the knees against the body, as in the illustration.

3

Raise the subject's left arm and press the shoulder back, so as to elevate the chest walls. Air will rush into the lungs when the arm is raised and the shoulder pulled back.

4

Press down on the ribs, as in the illustration. Repeat numbers 2 and 3 about twelve times a minute. Give friction toward the heart after breathing has been restored—never before.



SCHAFER OR PRONE PRESSURE METHOD—FIRST POSITION

VARIOUS METHODS OF INDUCING RESPIRATION

E. A. SCHAFER, F. R. S., EDINBURGH PROFESSOR
OF PHYSIOLOGY

*Reprinted from Journal of the American Medical
Association*

*SCHAFER PRONE PRESSURE METHOD

The operator kneels or squats by the side of or across the patient, places his hands over the lowest ribs and swings his body forward and backward so as to allow his weight alternately to fall vertically on the wrists and to be removed; in this way hardly any muscular exertion is required. The abdomen, being pressed against the ground, forces the viscera against the diaphragm, which is thereby itself moved upward, driving air out of the lungs. When the pressure is relaxed, the elasticity of the parts causes them to resume their former shape and volume, and air is drawn in through the glottis. The pressure is exerted gradually and slowly, occupying some three seconds; it is then removed during two seconds and again applied; and so on some twelve times a minute.

*NOTE: This method is the result of experiments made in 1890 and in later years, at the suggestion of the Royal Medical and Chirurgical Society. The methods which follow are of earlier origin.



SCHAFER OR PRONE PRESSURE METHOD—SECOND POSITION

Respiration

SYLVESTER OR SUPINE METHOD

In this, an attempt is made to imitate natural respiration by raising the ribs and thus increasing the capacity of the thorax. This is effected by forcibly drawing the arms upward toward the head; the muscles passing from the arms to the chest wall, which are attached to the ribs, are thus made to drag the ribs upward. Expiration is effected by lowering the arms and pressing them against the sides of the thorax. At least three persons are needed to operate by this method, one to move the arms, another to hold the tongue out from the mouth—for the patient is in the supine position—and a third to hold down the trunk and prevent its being bodily moved.

HOWARD METHOD

This method consists in laying the patient on his back, kneeling over the lower part of the body, and alternately pressing on the lower part of the chest and relaxing the pressure, repeating the operation eight or ten times a minute. In practice great care is necessary, for the tongue is apt to fall backward and block the pharynx, therefore needing to be drawn forward; the ribs in senile subjects are brittle and may be fractured; and the liver in asphyxia is congested and

Respiration

greatly enlarged and is liable to be ruptured (this is especially the case in drowned subjects).

MARSHALL HALL METHOD

This consists in rolling the patient alternately from the lateral to the prone position and pressing on the back between the shoulder blades when in the latter position. It has the advantage over other methods that the tongue does not require to be drawn out of the mouth by a special operator, and that, in cases of drowning, water and mucus tend naturally to flow out.

USE OF BELLOWS

If the nozzle of a bellows is introduced into one nostril, the other nostril being left open but the mouth shut, it is possible by a vigorous movement of the bellows to distend the lungs quite efficiently, and, by repeating the movement regularly, to carry on artificial respiration.

PART IV
WATER SPORTS

Water Sports

RACES

In a water carnival or tournament, the following events are generally included: Tilting contest, water polo, team race, obstacle race, hand paddle race, egg and spoon race, diving through hoop, wrestling in water, where the water is shallow enough, and where it is too deep a ducking contest takes its place. These items on the program usually go along with ordinary fast sprints, handicap races, races on back for 50, 100, 220, 440 and 880 yards, neat and fancy diving contests, etc. Spectators are not pleased with races of greater length than a half mile. From a spectacular standpoint, there is no outdoor contest that can compare with a good water carnival.

Various Races

RELAY OR TEAM RACE

The fastest swimmers are usually made captains, and these toss for first choice. The race, if the pool or tank is fourteen feet wide, can be participated in by two teams; if eighteen feet wide, by three teams, and so on. Any number, from four to ten, can take part on each team.

The captains, having chosen their men, form in a line in front of them, and at the word "go," the slowest man from each side dives in first, swims to the end of the tank, touches, turns, and swims back. The next man in line dives over the returning swimmer as soon as he touches, and so on down. The first team that finishes, wins. The speedy swimmers should be kept until the last. This is a splendid method for developing fast sprinters.

HANDICAP RACES

There is nothing like a 100-yard straightway handicap race to increase the speed of swimmers. In such a contest the object of the handicapper is to have the swimmers all arrive at the finish as close together as possible. The handicapper of a swimming club should have two assistants in order to take the time of every member.

Various Races

SUGGESTED BASIS FOR HANDICAPPING

SLOW SWIMMERS TO INCREASE THEIR SPEED

Yds. Secs.

A swims	100 in	90 and starts at	count of	30
B	" 100 "	98	" " " "	" 22
C	" 100 "	70	" " " "	" 50
D	" 100 "	80	" " " "	" 40
E	" 100 "	86	" " " "	" 34
F	" 100 "	100	" " " "	" 20
G	" 100 "	105	" " " "	" 15
H	" 100 "	110	" " " "	" 10
I	" 100 "	118	" " " "	" 2
J	" 100 "	102	" " " "	" 18
K	" 100 "	95	" " " "	" 25
L	" 100 "	120	" " " "	" 0 "go"
M	" 100 "	81	" " " "	" 39
N	" 100 "	63	" " " "	" 57

Add the swimmer's time to the handicap and you get the time of the slowest man.

HURRY-SKURRY RACE

Run to the water's edge, swim to your canoe, jump in, and paddle back. The contestants line up, each about fifty yards from the water's edge, opposite his own canoe, which is held at about thirty yards from shore. In the absence of canoes, rowboats will do.

Various Races

OBSTACLE RACE

The object of this race is to swim around or get over as many as possible of the obstacles placed in the way of the contestants along a course of from fifty to one hundred yards, such as hoops, barrels, scows, poles, etc.

OLD CLOTHES RACE

1. Let each contestant have a suit of old clothes placed in a pile on a large float fifty yards away from the starting point. At the word "go," the contestants dive into the water and swim to the float, dress, and swim back in a complete suit of clothes, including hat, waistcoat, and even shoes.

2. Dressed in a full suit of old clothes, each contestant swims to the float that is placed opposite; undresses to his bathing suit, and returns. This is often a more laughable affair than No. 1, as wet clothing clings to the body.

LIFE-SAVING RACE

Contestant dressed in old clothes, including shoes, hat, and waistcoat, swims to a point fifty yards away, towing a mate, and, on the return, the two change places.

As it is impossible to prevent the towed ones from sculling on the sly, and thus helping their companions, sculling should be permitted, but the leg kick of the one towed must be absent.

Various Races

CROCODILE RACE

Two teams of even numbers line up behind their captains, each keeping his hands on the hips of the man in front, and, with the exception of the first man, all swim by the power of the leg kick. Place the person with the strongest kick last, so as to keep the line unbroken.

HILL DILL OR POM POM PULL-AWAY

This game can be played only in a tank about thirty feet wide and in the deep end. Every one but the person who is "it" lines up on one side. The one who is "it" calls "Hill dill!" when every one must plunge across. Whoever is caught before he touches the other side helps catch others on the return plunge and so on until all are caught. This is a great game at the Brookline Swimming Club.

ALLIGATOR RACE

Two teams line up on their backs, each swimmer clasping the man behind around the head or neck with his feet. All swim with sculling motions of the hands, except the last man who can use his legs to kick. Place the best kicker last.

EGG AND SPOON RACE

From a standing or water-treading start, each contestant places a dessert-spoon handle in his

Various Races

mouth, with a hard-boiled egg in the spoon. The first to arrive, with the egg in the spoon, wins. Any contestant who permits his egg to fall out of the spoon is out of the race. Women may, with perfect safety, enter this race with men—indeed, they often win.

CANDLE RACE

The contestants line up opposite a row of candles, with matches beside them, placed on the far edge of the tank. At the word "go" the swimmers start for the other end, and, upon arrival, light their candles and swim back.

HAND PADDLERS' RACE

Four or five persons, seated in a canoe, paddle with the hands, on both sides of the canoe. The endeavor should be to strike all in unison, and with both hands at the same time. Lean over with a shoulder on each gunwale.

FOUR STYLE RACE

Contestants swim four lengths of the pool, changing style each length, thus: (1) broad stroke on breast; (2) crawl or trudgeon; (3) English overarm or side underarm; (4) alternate overarm or double overarm on back.

LIVE DUCK RACE

Procure a half-wild duck and liberate it fifty yards from the line-up. The contestants try to catch the duck.

Various Contests

GOLD FISH CATCHING CONTEST

Liberate a number of gold fish, and offer glass bowl as a prize to the one who catches most fish.

PICK-A-BACK WRESTLING CONTEST

The water should be up to the armpits for this contest. Two men stand in the water, each having a man astride of his neck. The riders endeavor to unhorse each other, while the under men try to maintain a firm balance by active foot work and judgment. The upper man will lock his feet behind his "horse's" back, while the "horse" will wrap his arms around his rider's shins.

INTER-COLLEGIATE OR INTER-CLUB MEET

The events in such a contest should be sufficient to conclusively prove the all-round superiority of one or the other club to the entire satisfaction of all. Two men should represent each club in each event.

- 1.—50-yard race.
- 2.—150 yards on back.
- 3.—100-yard race.
- 4.—^(a)Neat and fancy diving contest. ^(b)Plunging for distance.
- 5.—220-yard race.
- 6.—Life-saving race.
- 7.—Relay race.
- 8.—Soccer water polo.

Records

Should the contest be between women's clubs then fancy and ornamental swimming should be substituted for water polo.

SOME RECORDS

50 yards straightway—Alex. Wickham, at Rush Cutter, Australia, Jan., 1910, in 23 3-5 sec.

100 yards, bath, 3 turns—C. M. Daniels, at Manchester, England, Sept. 7, 1907, in 55 2-5 sec.

100 metres—C. M. Daniels, at Olympic Games, London, 1908, in 1 min. 5 3-5 sec.

200 yards—B. B. Kieran, at Sydney, Australia, 1905, in 2 min. 12 3-5 sec.

220 yards—C. M. Daniels, at New York, Feb. 15, 1908, in 2 min. 25 2-5 sec.

300 yards—B. B. Kieran, at Sydney, 1905, in 3 min. 31 4-5 sec.

440 yards—B. B. Kieran, at Sydney, 1905, in 5 min. 19 sec.

500 yards—B. B. Kieran, at Leeds, England, 1905, in 6 min. 7 1-5 sec.

880 yards—B. B. Kieran, at Sydney, 1905, in 11 min. 11 3-5 sec.

1 mile (1,760 yards)—B. B. Kieran, at Sydney, 1905, in 23 min. 16 4-5 sec.

Plunging; 1 min. time limit—W. Taylor, Bootle, England, Sept. 5, 1906, for 82 ft. 7 in.

100 yards on back—H. J. Handy, at Chicago, January, 1910, in 75 1-5 sec., American record.

WOMAN'S RECORDS

75 yards—Miss Gertie Smith, Sheffield, England, Oct. 3, 1907, in 57 4-5 sec.

100 yards—Miss Jennie Fletcher, at London, 1907, in 1 min. 17 sec.

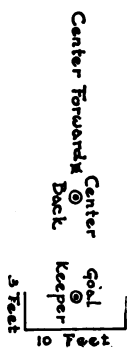
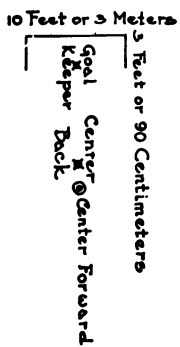
200 yards—Miss Ethel Mackay, at Barnley Baths, Scotland, in 2 min. 57 4-5 sec.

440 yards—Miss E. Mackay, Glasgow Baths, Oct. 3, 1907, in 6 min. 51 sec.

FIELD { 60 Feet by 50 Feet.
27 Meters by 15 Meters.

Left Back X @ Right Forward

Left Forward X @ Right Back



Right Back X @ Left Forward

Right Forward X @ Left Back

WATER POLO FIELD

WATER POLO

Water Polo is a game with no peer in the way of sport. Although the players have to stand a good deal of punishment, they come out at the end of the game none the worse for the struggle. On the contrary they are greatly benefited by the vigorous trunk-and-shoulder exercise. As a red-blood producer some Yale professor has said that it is king of all games.

I have given the rules of the English or soccer game, as played at London, 1908, and throughout the Continent of Europe. The Canadian game differs only slightly from the European form.

RULES OF CANADIAN GAME

1. *Ball*: 25 inches to 28 inches in circumference, round and fully inflated.
2. *Width of goal*: 6 feet. (Goal keepers must remain within the six-foot limits.)
3. *Height of goal*: 2½ feet.
4. *Length of field*: Not less than 50 feet, nor more than 100 feet.
5. *Width of field*: 30 feet at least.
6. *Number of players*: 6.
7. *Time of play*: 20 minutes, divided into four five-minute periods.

Water Polo

The ball touches the water on the first throw-out, before it is in play. Two players cannot tackle one man. The ball may be held under water during the struggle for possession.

The American game is a matter of playing "the man more than the ball," while in the English and Canadian games it is "play the ball or be penalized." But the American game is the only practical one for small pools. In this game the ball is only three-fifths inflated, and is pushed to the goal, which is a mark 4 feet by 1 foot, and held there. There is very little throwing, and many crack players of this style cannot throw a fully inflated ball, unless they are standing on bottom. A player can duck an opponent when within four feet of the ball, which permits of much spectacular play, and is thoroughly enjoyed by the players as well. It also gives splendid life-saving practice. This is not a "Beg-pardon" game by any means, and a very small percentage of those who play intercollegiate games engage in this "ducking match." The rules are being made stricter every year. Personally speaking, I like the game, and would mix the best elements of both forms, keeping the scientific features of the English game—such as full inflation of the ball and the throwing of the ball through, instead of holding it against, the

Water Polo

goal. I would adopt the Canadian sized goals and allow the American privilege of ducking when within a yard of the ball. I would hold the Canadian rule, that two players cannot tackle one man, and only two can tussle over a ball at once. Such rules as these the boys at the University of Toronto use and enjoy to the limit. In the American game the players line up out of the water, which is a good idea; and the six men to the game is another good idea, especially when play is not in the open water.

To be effective, the water polo player must swim the trudgeon and crawl strokes. The backs should be quick enough to stay by the forwards, and should never let them get away. The center or center-forward is generally the fastest swimmer and the best all-round player. The goal keeper should be a buoyant person and long in reach. It takes considerable practice to throw the ball in deep water, but by hooking the wrists and spreading the fingers of the right hand well, and, at the time of throwing the ball, giving a strong kick and pressing down with the left hand, one can rise high out of the water and throw the ball a matter of 75 or 100 feet. For a short toss put the hand underneath the ball. Swimming up to the ball and tossing it behind without turning requires practice even

Water Polo

for old players. Always play water polo on an empty stomach; otherwise you will be in very great distress for wind.

OLYMPIC WATER POLO RULES, 1908

1. *Ball*: Round and fully inflated; not less than 65 centimeters nor more than 70 centimeters in circumference; waterproof, smooth and free from any sticky matter.
2. *Goals*: Width, 3 meters; height, 90 centimeters.
3. *Uniform*: One team to wear dark blue caps, the other to wear white caps; both goal keepers to wear red caps.
4. *Flags*: Each goal scorer to be provided with a red flag; the referee with a blue flag, a white flag and a bell.
5. *Field*: Length, not more than 27 meters nor less than 25 meters; width, not more than 16 meters; the halfway line and the 3 meters 66 centimeters penalty lines to be marked on each side.
6. *Time*: Duration of play to be 7 minutes each way; time taken up in disputes, etc., to be deducted, so that 14 minutes' *actual playing* be the allotment. At half-time three minutes are allowed. When the ball is out of play for any reason whatever, that time must be deducted from the seven minutes.

1901

Water Polo

7. *Referee:* His duties shall be to start the game, stop all unfair play, decide all cases of dispute, declare fouls, goals, half-time, and time. His decision is final, but he may change his decision if he does so before the ball is again in play.
8. *Goal Scorers:* They shall stand at the side near each goal, to declare, by waving a red flag, when a goal has been scored at their end. They shall not change ends at half-time. They signal to the referee, and each is responsible for his own end and for nothing else.
9. *Teams:* Seven men on a side; one goal keeper; center, right and left forward; center, right and left backs. No player is permitted to oil the body.
10. *Captains:* The captains shall toss for choice of ends.
11. *Starting:* Players line up at each goal line in the water. The Referee should stand in line with the exact center of the field. The Captains signal that they are ready. The Referee calls "Go," and then throws the ball into the exact center of the field. The ball must be handled by more than one player before a goal can be scored.

Water Polo

12. *Scoring:* The entire ball must pass under the cross bar before a goal is scored.
13. *Ordinary Fouls:*
 - (a) To touch a ball with both hands at the same time.
 - (b) To hold the rail or side during any part of the game.
 - (c) To stand on or touch the bottom during any part of the play, excepting to rest when the ball is not near.
 - (d) To interfere with or impede an opponent in any way, unless he is holding the ball.
 - (e) To hold the ball under the water when tackled.
 - (f) To jump from the bottom or push off from the side (except at starting or re-starting) in order to play the ball or duck an opponent.
 - (g) To hold, pull back, or push off from an opponent.
 - (h) To turn on the back and kick at an opponent.
 - (i) To assist a player at the start or re-start.
 - (j) For the goal keeper to go more than four yards from his own goal line.
 - (k) To throw the ball at the goal keeper from a free throw.

Water Polo

- (1) To refuse to play the ball at the command of the referee, after a foul, or after the ball has been out of the field of play.

Note: Dribbling, or striking the ball, is not holding; but lifting, pressing under water, or placing the hand over or under the ball, when actually touching, is holding. Dribbling the ball up and through the posts is permissible.

14. *Wilful Fouls:* (a) To start before the word "Go."

- (b) To deliberately waste time.
- (c) To take up a position within two yards of an opponent's goal.
- (d) To deliberately change position after the whistle has blown, with a view to taking advantage of an opponent.
- (e) To deliberately splash in the face of an opponent.

Penalty: To be ordered out of the water until a goal has been scored; and not to be permitted to enter at half-time, if no goal has been scored, and if a goal has been scored, only by permission of the referee. On a player's refusal to leave the water at command of the referee, the

Water Polo

referee shall stop the game and award the decision to the other side.

15. *Free Throws:* A free throw is given to the nearest opposing player from the place where the foul was committed. The thrower may throw, not for the goal, but to one of his own side.
16. *Penalty Throw:* A player, wilfully fouled when within four yards of his opponents' goal line, shall be awarded a free throw for goal. This may be taken from any point on the four-yard line.
17. *Declaring Fouls:* On a foul being proclaimed by the referee, he shall wave the flag of the color that the free throw is awarded to. Should a member of each team commit a foul about the same time the referee shall order the ball out of the water and throw it between the offending members. The ball must touch the water first before it is in play.
18. *Goal Keeper:* The goal keeper may stand to defend his goal, and must not throw the ball beyond half-distance. The penalty for doing so shall be a free throw to the opposing side from half-distance at either side of the field of play. The goal keeper is exempt from clauses (a), (c) and (f).

Water Polo

in Rule 13, but he may be treated as any other player when in possession of the ball. Should the goal keeper be ordered out of the water for a wilful foul, the man taking up the position as goal keeper shall do so as an ordinary player, but at half-time a player can be officially appointed as goal keeper. Unless a goal keeper is injured another player cannot be appointed until half-time.

19. *Goal and Corner Throws:* A player, throwing a ball over his own goal line, shall concede a free corner throw to his opponents, and such shall be taken by the player on the opposing side nearest the point where the ball leaves the field. The goal keeper has a free throw in every case where the ball passes his goal line, but, if he should permit the ball to drift or pass under the crossbar by his own carelessness in handling, then a corner throw shall be awarded the other side.
20. *Out of Play:* The player who throws the ball out of the boundary line must concede a free throw to the other team from where it left the field of play at the side. Should the ball strike an obstruction overhead, and again bound back, it is in play, but should

Water Polo

it lodge there, the referee will return it to the water immediately under where it lodged.

21. *Declaring Goals, Time, Etc.:* The referee shall declare fouls, half-time and time, by whistle; goals, by bell. The time-keeper may notify time and half-time by whistle.
22. *Leaving the Water:* A player, leaving the water, or sitting, or standing on the steps, or sitting on the side of the pool, excepting at half-time, or by permission of the referee, shall not re-enter until a goal has been scored, or until half-time. Should a player leave the water he can re-enter only at his own goal line. If any player leaves the water during the progress of the game, without permission of the referee (except in case of illness or accident) or refuses to enter the water at the request of the referee, the team to which such player belongs shall be deemed to have lost the game.

TRAINING HINTS

There is no better help toward the correction of a sprinter's faults than the moving-picture method. The subject should swim in the strong sunlight within twenty feet of the machine, which is elevated so as to look down on the swimmer at an angle of forty-five degrees. When the film is developed, the coach can point out on the screen defects in style that were not even thought of, much less discerned, at the water's edge.

The body of the swimmer should be driven through as small a displacement of water as possible, and, in order to accomplish this to perfection, the pupil should aim for style first; then, having acquired a style without a fault, let him turn to speed, having timers on hand to test his efforts.

A sprinter should rest the day before a race, and thus gather up energy, as sprinting requires a tremendous amount of energy, and I am not sure but that a sprinter requires even more vitality than a long-distance swimmer. Swimmers that wish to excel in their work should avoid heavy gymnastics and keep to swimming alone.

The sprinter who is about to enter a race will

Training Hints

do well to eat sparingly of his last meal; thus, not having spent all his energies at the table, he will have plenty to spare for the race. A person gets much of his strength for the day's work from the food that was eaten the day before, and any food in the stomach at the time of a race is a decided hindrance instead of a help. The diaphragm, which is the large breathing muscle, can work more freely when there is no pressure against it from a full stomach. After a heavy dinner a person soon gets out of breath, and very fat persons are easily winded for the same reason.

It is very necessary that the colon be empty before a race; for, if the contestant be even slightly constipated, the distended colon will cause the athlete to have that heavy, logy, or anchored feeling which is so certain to bring defeat. The only hygienic, and therefore the only safe method of emptying the colon, is by the enema, cascade, or internal bath. To take a purgative is decidedly weakening. An enema of warm water will not enervate, while a purgative is relaxing.

In preparing for a long swimming race, or for a succession of short sprints, there is nothing so important as the diet. I think the substitution of nuts for meat, if they are found to be readily

Training Hints

digested, is a good idea. The nuts should always be chewed to a liquid form before swallowing, otherwise more harm than good will result from their use. Honey and sweet fruits are better than cane or beet sugar. Corn and rice have some qualities that render them preferable to white bread, oatmeal, beans and peas. Some form of well-toasted whole wheat or corn, together with fruit juice, makes a splendid, clean food for the particular athlete. Good cream and butter I would not place the ban on, but cheese is not easily digestible. Ripe olives and tomatoes are good. Olive oil may be used freely, both alone and with salad. Lemon juice is much better than vinegar in all cases. Do not throw away the skin of the wheat or the plum, nor the seed of the grape, but eat coarse foods, that will keep a constant action of the bowels, and thus prevent constipation, which is the foe of all mankind, and means sure ruin to the athlete. He should strive for organic vigor rather than for muscle. An athlete and his stomach are very intimately connected, and you cannot separate them; the plainer his diet the better. I recommend that he read over the first chapter of Daniel several times, and then the whole book. The best athletes are clean men—clean internally as well as externally.

Training Hints

Stimulants of all kinds, as tea, coffee, and, of course, all spirituous liquors, etc., should be entirely dropped from the menu of an athlete, whether he be a sprinter or a long-distance man. The excitement of the moment ought to be quite sufficient to stimulate any normal person to do his best during a race.

Tobacco has been condemned as a nerve-destroyer by all scientific and non-scientific trainers alike. Tobacco users are characteristically short-winded and troubled by irritability of the heart. The fact that one man who uses tobacco is so much better than another who does not, is no argument in favor of the weed, for the one who does not would be worse if he did, while the one who does would give a still better performance if he discontinued its use, or, better still, if he had never used it.

To those who are subject to cramps I advise an immediate change in diet, from a heavy proteid to a light proteid. The proteids are the muscle-forming foods, such as fish, flesh, fowl, and, although they are very necessary, yet there is a great danger of the blood becoming charged with toxins through their use. On a high proteid diet, the muscles are more apt to be cramped than when they are underfed. Muscular soreness and rheumatism arise from similar causes.

Training Hints

The cramp generally affects the gastrocnemius muscle, which is situated in the calf of the leg. Sometimes the muscles of the thigh are affected, and frequently those of the sole of the foot. These minor affections do not worry a person much, but when the more important of the larger muscles are cramped it is decidedly painful, and they should be rubbed and massaged well. Friction upon the skin is good. Place the limb in as hot water as can be endured without discomfort, or in the hot sand. The soreness resulting from a cramp will last several days after the cramp. Many suppose that a cramp is wholly the result of placing a heavy strain on an unused muscle, but I am certain that the food that makes the blood that makes the muscle is the remote or predisposing cause, although the use of a new set of muscles may be the immediate cause. But the immediate cause is of minor importance in comparison with the other. In all my experience as a swimmer I have never had a cramp myself, nor have I seen a person in danger of drowning from this cause. For years it has been an everyday occurrence for me to rub a cramped leg, yet I have never heard any one remark that he had a narrow escape from drowning as a result of the cramp. Persons troubled with cramp usually swim ashore, or to

Training Hints

the side of the pool, and complain of the pain of the cramp, but they never think of danger, and very rarely ask to be helped to land. Cramps are almost entirely confined to men. I can remember only one case of a woman being so afflicted. Cramps are not progressive. I have known men to have a cramp every time they went in swimming, year after year; then suddenly a day would come after which they would never have a cramp. I knew a young man who had a very severe cramp the first time he went in swimming, and never after had another.

PART V
NATATORIUMS

Natatoriums

HINTS ON BUILDING NATATORIUMS*

In selecting a site for a natatorium, be sure that it has a good, sunny exposure. If it is an outdoor pool it should be wind-sheltered from the north, west, and northeast. Location on sand or gravelly soil will result in a saving, not only because the cost of excavating is less, but because the matter excavated may be used in concreting. The presence, in the neighborhood of an ice manufacturing plant opens the possibility of a constant supply of hot water; in the process of manufacturing ice, the hot water is, as a rule, wasted. The practice of building swimming pools in ill-ventilated cellars cannot be too severely censured. Cramped quarters, with low ceilings and little space for onlookers are undesirable from every point of view. Natatoriums

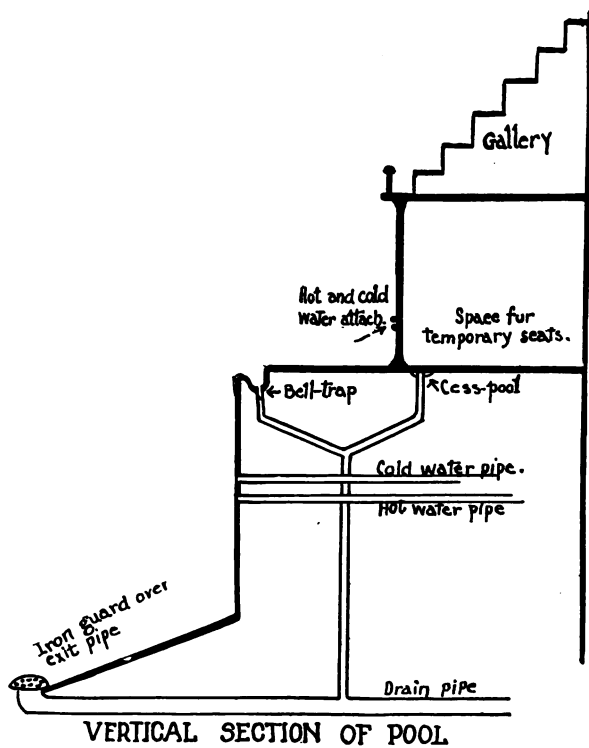
*NOTE: For carefully studied description of the pool in its relation to Association buildings, consult "Hints About the Construction of Association Buildings" (Y. M. C. A. PRESS, 15 cents).

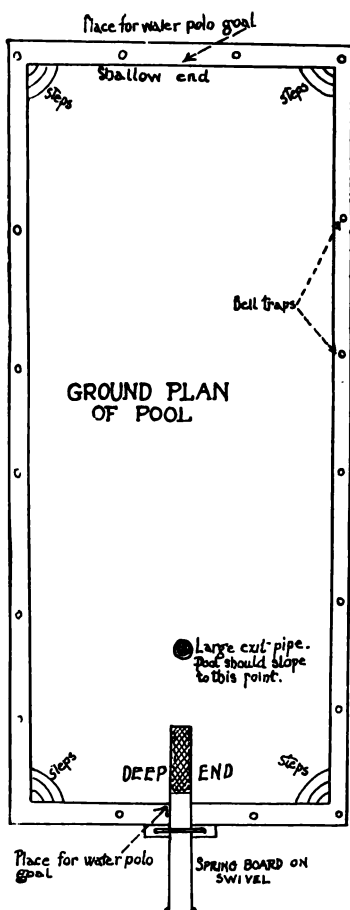
Hints on Natatoriums

should have high ceilings, with galleries entirely surrounding the pool. The light and ventilation should be more from above than from the sides. It is a good idea to construct both the roof and the south side of the building of glass. This should be of a kind that the sunlight can penetrate, but through which an outsider cannot see. The acoustic properties of natatoriums are, with very few exceptions, unsatisfactory. The Coliseum Pool, at Louisville, was built with three sides of wood and one side of brick, and this arrangement resulted, in that case, in perfect acoustic properties.

The water-heating system cannot be too carefully considered. The old way of running a live-steam pipe into the pool, when the boiler is many yards away, is a most expensive method, since every added yard requires an added pressure to force the steam in. The cold-water pipe that leads into the pool should pass close to the boiler, which should be connected with it by a short pipe. Thus can the water be heated as it enters the pool. The water should run into the pool at a higher temperature than you require it, for it cools off soon.

The exit pipe should be so large that the pool can be emptied rapidly; thus facilitating a thorough and speedy cleaning. A half hour, or, at





Hints on Natatoriums

most, an hour, is as long as any pool should take to empty.

The sanitary arrangements of a natatorium cannot be too carefully looked into before plans for building are completed. The exit from the dressing rooms should lead through the shower room, so that swimmers will have it made as easy as possible to enter the pool clean.

The overflow gullies should not be more than an inch or two above the water level and should run around the entire pool. They should be deep enough to drain thoroughly any slime or sputum, and should be used as cuspidors. The walk around the pool should slope from the pool to gullies and drains.

Pools should be built a uniform length—not 48, 59, 69, or 144 feet; but 50, 60, 75, 100, or 150 feet; $50 \times 6 = 300$; $60 \times 5 = 300$; $75 \times 4 = 300$; $100 \times 3 = 300$; $150 \times 2 = 300$; and 300 feet are equal to 100 yards.

It is a good idea to have the bottom as well as the sides lined with white tile brick, with straight lines of black tile running lengthwise, four feet apart, and ending three feet, six inches from each end. This will enable crawl racers to keep a straight course, and give them a hint when they are nearing the end.

Shallow pools are much better for purposes of

Hints on Natatoriums

instruction than deep pools, while deep pools are better for diving and water polo. The equipment in the form of chute, trapeze, high dive, horizontal bar and rings cannot be too carefully placed in order to avoid accidents.

An ideal springboard is made in the following manner: Material, Georgia pine, as free from knots as possible; length, 14 feet; width at base, 16 inches; width at end, 12 inches; thickness at base, 3 inches; thickness at end, 1½ inches. Place the shoulder four feet from the base, and let the slope be slightly upward toward the end. Oak boards very soon warp when wet. Cover the length with carpet and slightly pad the end.

The water in the pool will, as a rule, contain three varieties of dirt; that which floats, that which is suspended, and that which settles on the bottom. In the process of heating the water up to the required temperature, a soapy, frothy substance will come to the top; dust also will settle on the surface; hair at first will float, then sink to the bottom, where it will gather in bunches. This class of dirt can be cleansed by sweeping, or spraying with a hose; hence the necessity of a scum trough, with large bell traps, over which are strainers. Sand and mud will settle on the bottom, but the animal effluvia and vegetable

Hints on Natatoriums

matter will remain two or three feet under the surface. Filters should be provided for in the estimates. If the artesian water is not quite clear it should not be used in preference to river or lake water, as ear trouble of a distressing nature often results from swimming in impure artesian water.

The gallery and every permanent seat should be so situated that the entire pool can be seen.

Painting a concrete pool is a matter of knowledge and skill, and should be given only into the hands of those who understand their business. Should there be the least dampness in the cement the paint or enamel will peel off in flakes. A pool 60 by 20, and the usual depth, would take on about \$50 worth of paint; that is, about one flat coat and two coats of bath enamel.

If the sewer level is high in the street, and the intention is to have the swimming pool in the basement, this will probably call for a centrifugal pump in the estimates. Raise the pool if possible; pump-drained pools are expensive and slow in emptying. If city water is too expensive, drive down an artesian well.

Unless the pool has a very small patronage I should advise against the circulating pump plan. A constant flow in and out is preferable, especially on sanitary grounds.

Hints on Natatoriums

The walk around the pool should be rough sanded when the concrete is drying. The slippery nature of some walks cause many painful and dangerous falls. Ceramic mosaic flooring is better than the head-cheese variety, since the feet are not so apt to slide over it.

The nickel-plated or galvanized iron bar around the pool at the water level should be entirely abolished, the rounded edge of the scum trough serving the purpose very much better.

The square type of steps descending into the pool should be superseded by the rounded style, as the sharp corners cause many a hard knock to the swimmers. Iron ladders are the most awkward means of descending into the pool. There should be no pipe or bar projecting into the pool.

A sudden drop or too steep a floor for the pool is dangerous, having in some cases resulted in drownings.

In addition to leaving space around a pool for onlookers, it is well to provide for a separate entrance for the public. Thus ladies and gentlemen will not have to pass through the dressing rooms or shower-bath department. This is very important, as the expense connected with a natatorium can be greatly curtailed by large gate receipts. Water polo will draw as large a crowd of

Hints on Natatoriums

spectators as rugby football if the accommodation will permit.

Never light up a natatorium with gas, but always with electricity. The gas burns the oxygen out of the air.

The waste steam from near-by factories is often available for heating the water in the pool.

The necessity of having back-water gates should be carefully considered before the concrete sets over the plumbing. These should be in the estimates where the main sewer is none too low.

The cold-water pipes running through the shower rooms and natatorium should be of galvanized iron and should not be covered with any material that will mold, as the steam will condense on it and start trouble at once; pipes should be left bare and placed so that the cold water which accumulates on them will not drop on the patrons.

If possible, have the shower department so placed that the steam will not enter the swimming pool, as the majority of swimming pools have an atmosphere too highly charged with steam, from a hygienic standpoint. I do not see the necessity for having steam rooms in connection with swimming pools.

SUTRO BATHS, SAN FRANCISCO

Ideal natatoriums should have glass roof and sides so as to permit the direct sunlight to fall upon the bathers. The picture shows one view of the largest and best equipped swimming pool in the new world. Until its destruction by fire, the best swimming pool east of the Mississippi was the Coliseum at Louisville, which was 50 yards by 50 feet. But even that could in no way be compared with Sutro Baths.

PARTIAL VIEW

The second illustration shows different departments where swimmers can have their choice in the matter of temperature. Some may desire a cold plunge while others like a long swim at a temperature of from 85° F. to 90° F.

This is a splendid pool in which to play water polo, according to English or to American rules, both games being excellent practice for life saving. It is also an ideal place for high and trapeze diving.

